BERRY TEST SETS

CALIBRATION TEST PROCEDURE FOR BERRY MODEL: 966AL5 TEST SET

October 1992

99-314-966-MAN

CALIBRATION TEST PROCEDURE

FOR BERRY MODEL: 966AL5 TEST SET

(c) Copyright 1992
Berry Test Sets, Inc.
All Rights Reserved

Berry Test Sets, Inc.
26 1st Avenue S.E.
New London, MN 56273
612-354-5825

The following calibration test procedures are written to thoroughly check the function of the unit to be sure it is within specifications.

When testing a unit that has an option in the lid, be sure to test the base unit first then proceed to test the option in the lid. For example, if your testing a 966AL5 unit, test the 966A first then the Drop and Insert in the lid.

When going through the procedure, always follow it in the steps it is written. If not and a step is skipped saying to select a different selection, it will throw off the rest of the procedure.

Also note when checking over unit to also check over the physical appearance including any dents in case that could be denting into the power supplies, or the PCB boards. Also check the tightness of screws holding down the power supplies, fan and rubber feet.

966AL5 DROP AND INSERT CALIBRATION TEST PROCEDURE

1.0 OBJECTIVE

This procedure provides all the necessary information to perform a calibration test on a Berry Test Set 966AL5 Drop and Insert. If any of the following tests fail, contact our service department.
Note: This procedure is meant to be followed in the manner it is written.

2.0 EQUIPMENT REQUIRED (or equivalent)

2.1 DS-1 PCM SIMULATOR
2.2 DS-1 PCM LINE & CHANNEL MONITOR (LCM)
2.3 FLUKE 8050A digital volt meter with a 600 ohm load or any Transmission Test Set (TTS) with a receive impedance of 600 ohm.
2.4 VF Transmission Test Set with an output of 1KHz at 0.00dB with 600 ohm impedance.
2.5 Berry 314AL5 Trunk Signaling Analyzer (within calibration).

3.0 INITIAL SET UP

3.1 Set 966AL5 power to ON.
3.2 Set Drop & Insert switches to: TERM, MON, SUPERVISION A and B bits to 0, EXTERNAL, D3/D4, TRANSMIT A/B Bit to 0.
3.3 Set TTS to measure frequency and level.
3.4 Set 966A TRUNK TYPE to E&M TERMINATING, FUNCTION to SIMULATE WINK, DISPLAY to BOTH.

4.0 TEST RECEIVE

4.1 Inject a known good PCM signal. Note Serial Label in the front of the unit, if serial label has the letters 'AFB' typed on it the input signal can range from 3 volts base to peak down to -24dB. If not the range is from 3 volts base to peak down to -10dB. After injecting signal all ALARM LEDs should go out.
4.2 If possible, inject known BPV, FRM, RMT (YELLOW), and SB alarms and note corresponding LED illuminates.
4.3 Turn on the A & B RECEIVE SUPERVISION LEDs and note corresponding LED illuminates.
4.4 Set PCM IN to BRDG, and note all ALARM LEDs should still be out. Set PCM IN back to TERM.
4.5 Connect TTS or meter to EXTERNAL T1R1 jack.

Digitized by the Internet Archive
in 2026

https://archive.org/details/manualsplus_13282

4.6 Send 1000Hz at 0.0dB on PCM.
4.7 Set DROP AND INSERT FORMAT and CHANNEL to that of the PCM signal and note meter indicates 1000Hz ± 1Hz at 0.0dB ± .1dB.
4.8 Set TEST SET to INTERNAL.
4.9 Connect a 310 cord from 966A T1R1 jack to a Digital Multimeter. Set meter to 2V AC scale. Meter shall indicate .755 to .795V AC (0.0dB ± .25dB).
4.10 Set TEST SET to EXTERNAL.

5.0 TEST XMIT

5.1 Plug a 310 cord from XMIT jack to PCM IN jack.
5.2 Set both TRANSMIT A/B BIT switches to 1, and note RECEIVE A and B LEDs illuminate. Set TRANSMIT A/B BIT switches to 0.

6.0 TEST PCM OUT

6.1 Leave 310 cord connected from XMIT to PCM IN.
6.2 Connect a 310 cord from PCM OUT to a PCM LINE and CHANNEL MONITOR. Set both units to the same FORMAT and CHANNEL.
6.3 Set DROP and INSERT MODE to DROP & INSERT and both SUPERVISION BITS to 1. Verify LCM RECEIVE A/B BITS are high (RED).
6.4 Set TTS output at 1000Hz at 0.0dB, 600 ohm impedance.
6.5 Connect 310 cord from TTS to EXTERNAL TR jack.
6.6 Verify LCM displays 1000Hz ± 1Hz at 0.0dB ± .2dB.
6.7 Switch thru the FORMAT and CHANNELS 1 thru 24 and verify LCM displays frequency and level at each setting.

7.0 TEST DROP AND INSERT RECEIVE

7.1 Disconnect all 310 cords from 966AL5.
7.2 Set 314AL5 DROP AND INSERT to TERM, DROP & INSERT, INTERNAL, all A/B BIT switches to 0. Set 314A to E&M ORIGINATING, AUTO SEND. Store Dial Pulse digits 1 thru 7 and MF digits KP, 0 thru 9, ST.
7.3 Connect a 310 cord from 314AL5 DROP AND INSERT XMIT jack to PCM IN jack. Connect another 310 cord from PCM OUT jack to 966AL5 DROP AND INSERT PCM IN jack.
7.4 Verify all ALARM LEDs on both units are out.
7.5 Set 966AL5 DROP AND INSERT switches to TERM, MON, INTERNAL, all A/B BIT switches to 0.
7.6 Set FORMAT and CHANNEL SELECT on both units to the same selection.
7.7 Press MANUAL key on 966A to clear any stored digits.
7.8 Verify 966A SUPERVISION LEDs are both ON HOOK.

7.9 Go OFF HOOK on 314A and verify A/B LEDs flash and ORIGINATING ON, OFF HOOK toggles when receiving DP digits.

7.10 Verify both SUPERVISION LEDs go OFF HOOK after Dial Pulse is received then MF record should be received, and a call completion tone is heard. Go ON HOOK on 314AL5.

7.11 NOTE: When receiving digits all ALARM LEDs should stay out.

7.12 Set 966AL5 DROP AND INSERT to EXTERNAL, connect a 310 cord from EXTERNAL T1R1, E&M jacks to 966A T1R1, E&M jacks.

7.13 Do steps 7.7 thru 7.11.

8.0 TEST: RECEIVE A/B INTERFACE

On the front panel of the Drop & Insert exists a jack labeled "REC A/B". This is for recording the status of the SUPERVISION BITS onto a device like a strip chart recorder.

Connect a power supply that has been set for 2.0 volts DC between ground (sleeve will work as a ground) and tip on the REC A/B jack (make sure negative on the power supply is connected to ground). Put a current meter in series with this circuit.

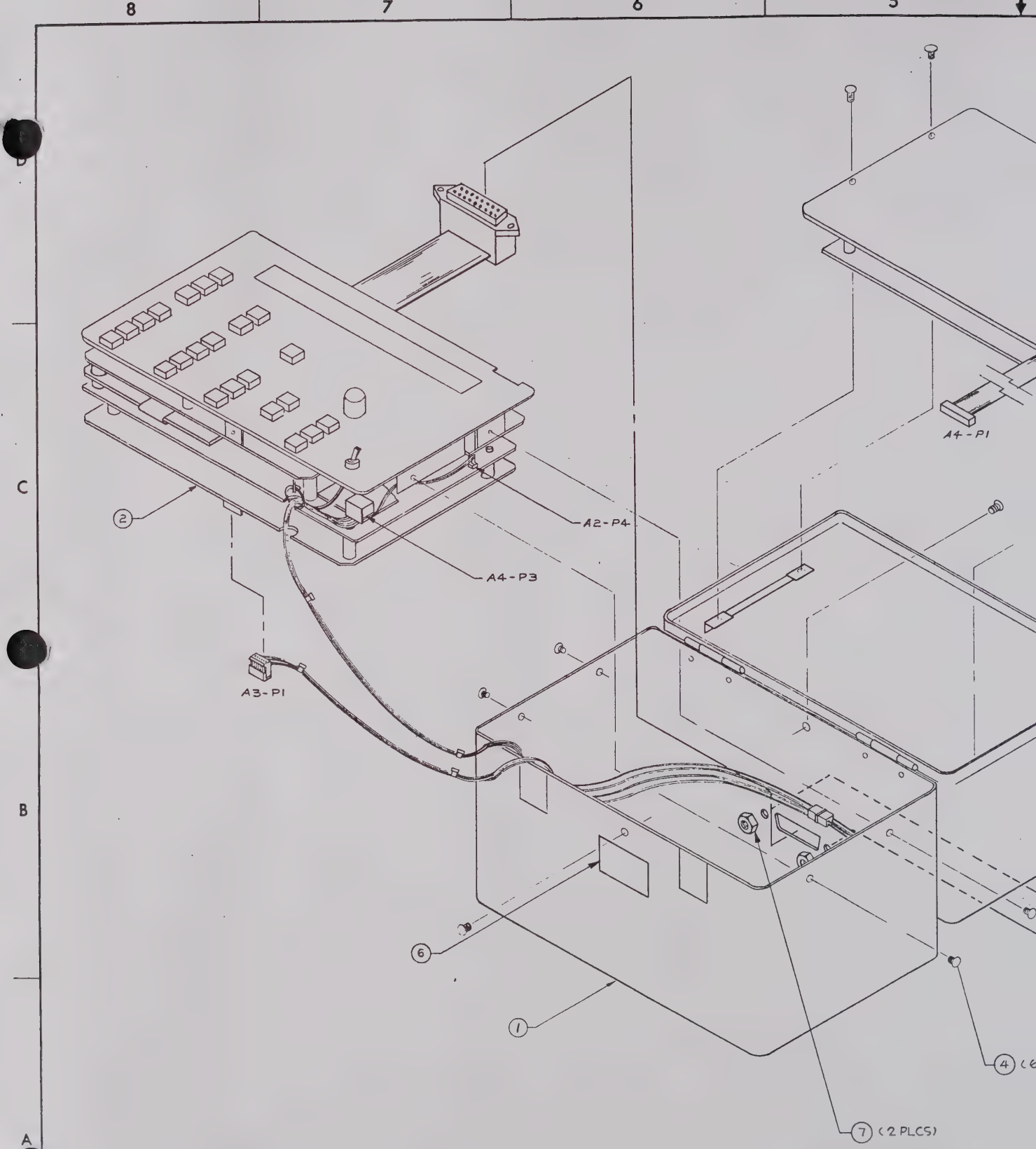
Leave 310 cord connected from XMIT to PCM IN.

8.1 Turn the transmit A button to one and the current meter should now read 27mA +\- 5mA. Turn the transmit A button back to zero and verify 0mA +\- 2mA is now flowing. Now turn the transmit B button to one and verify no change in the current meter. Put the B button back to zero.

Unhook the lead going to tip and connect it to ring.

8.2 Turn the transmit B button to one and the current meter should now read 27mA +\- 5mA. Turn the transmit B button back to zero and verify 0mA +\- 2mA is now flowing. Now turn the transmit A button to one and verify no change in the current meter. Put the A button back to zero.

This completes the 966AL5 DROP and INSERT CALIBRATION TEST PROCEDURE.



1. FOR WIRING DIAGRAM SEE DWG 3004-0101-01

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		(SEE SHEET 1)		

FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

MATERIAL: SEE B/M

FINISH: —

TOLERANCES (UNLESS OTHERWISE NOTED): U.S. / METRIC — XX ± / x ± — XXX ± / xx ± — ANGLES ±

SCALE 1.2 (DO NOT SCALE DRAWING)

C

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	R.S.	7-86
DRAFTING CHECKER	ENG.	8/21/86
ENGINEER APPROVAL	[illegible]	9/10/86
PROJECT MANAGER		
DRAFTING MANAGER	[illegible]	9/21/86
ENGINEERING MANAGER	[illegible]	9/10/86

BERRY ELECTRONICS

DRAWING TITLE: ASSY TRUNK SIGNAL ANALYZER 966A OPTION 5,6

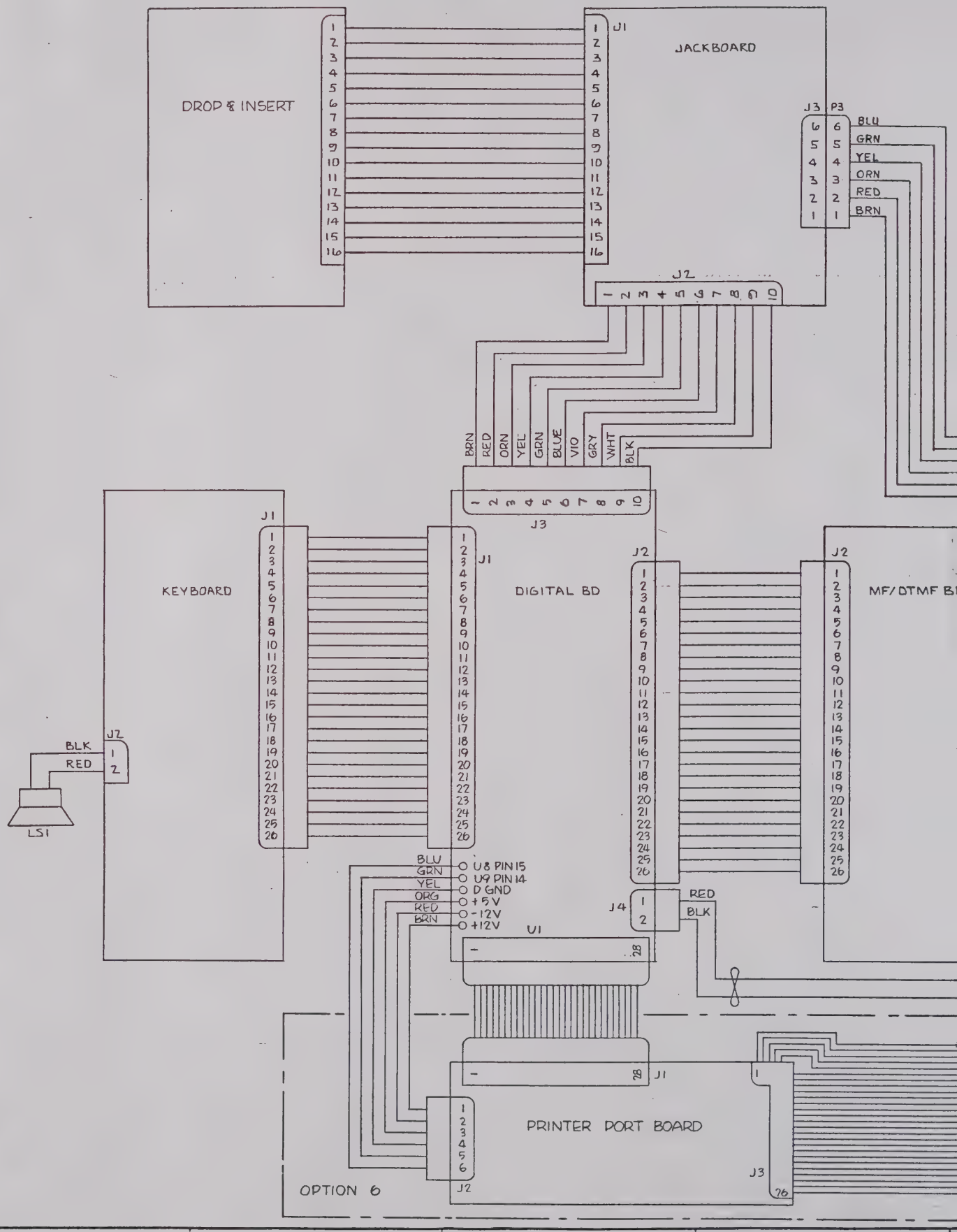
D — DRAWING NO. 3000-0101-02 — REV C

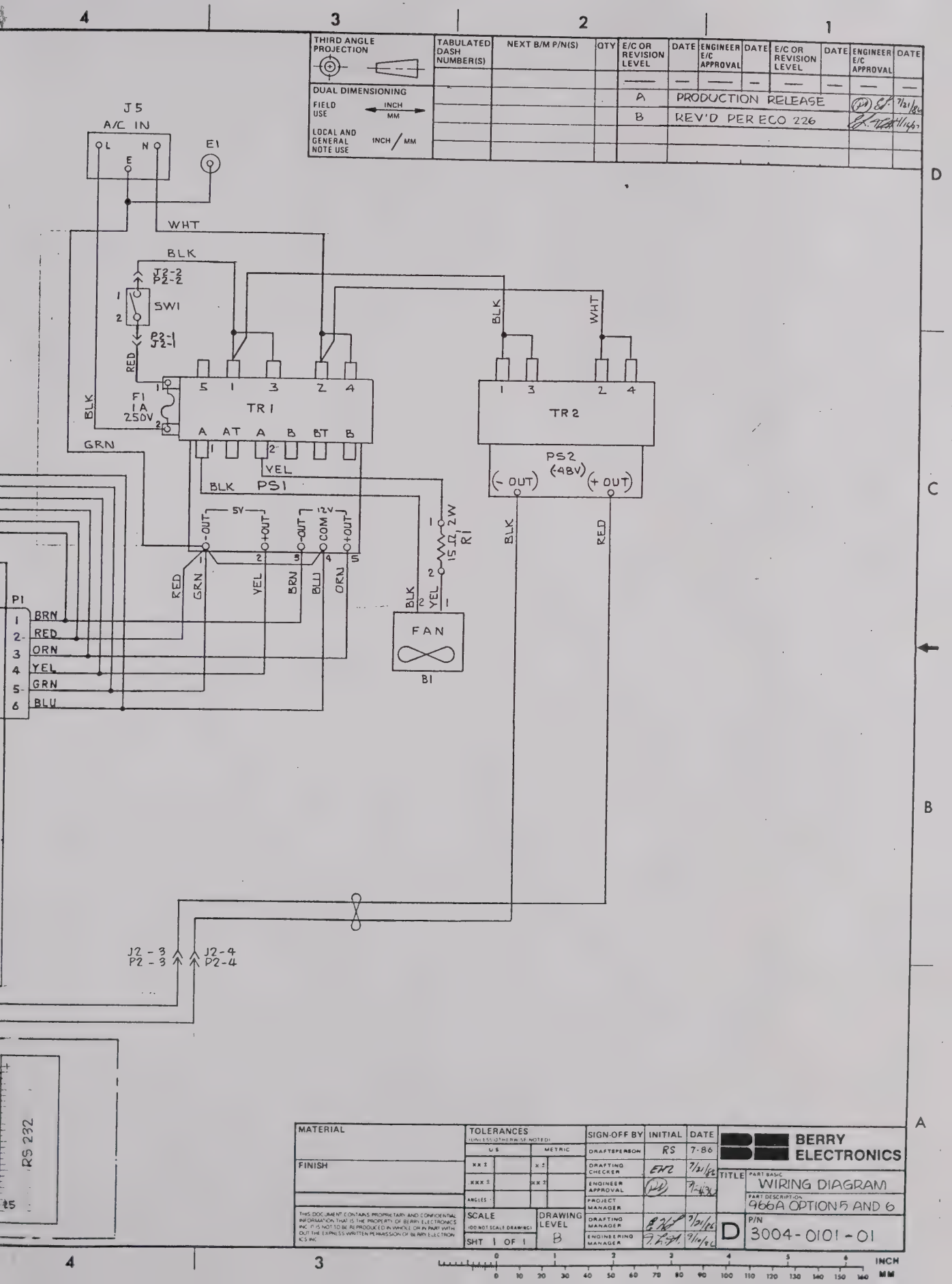
SHEET 2 OF 2

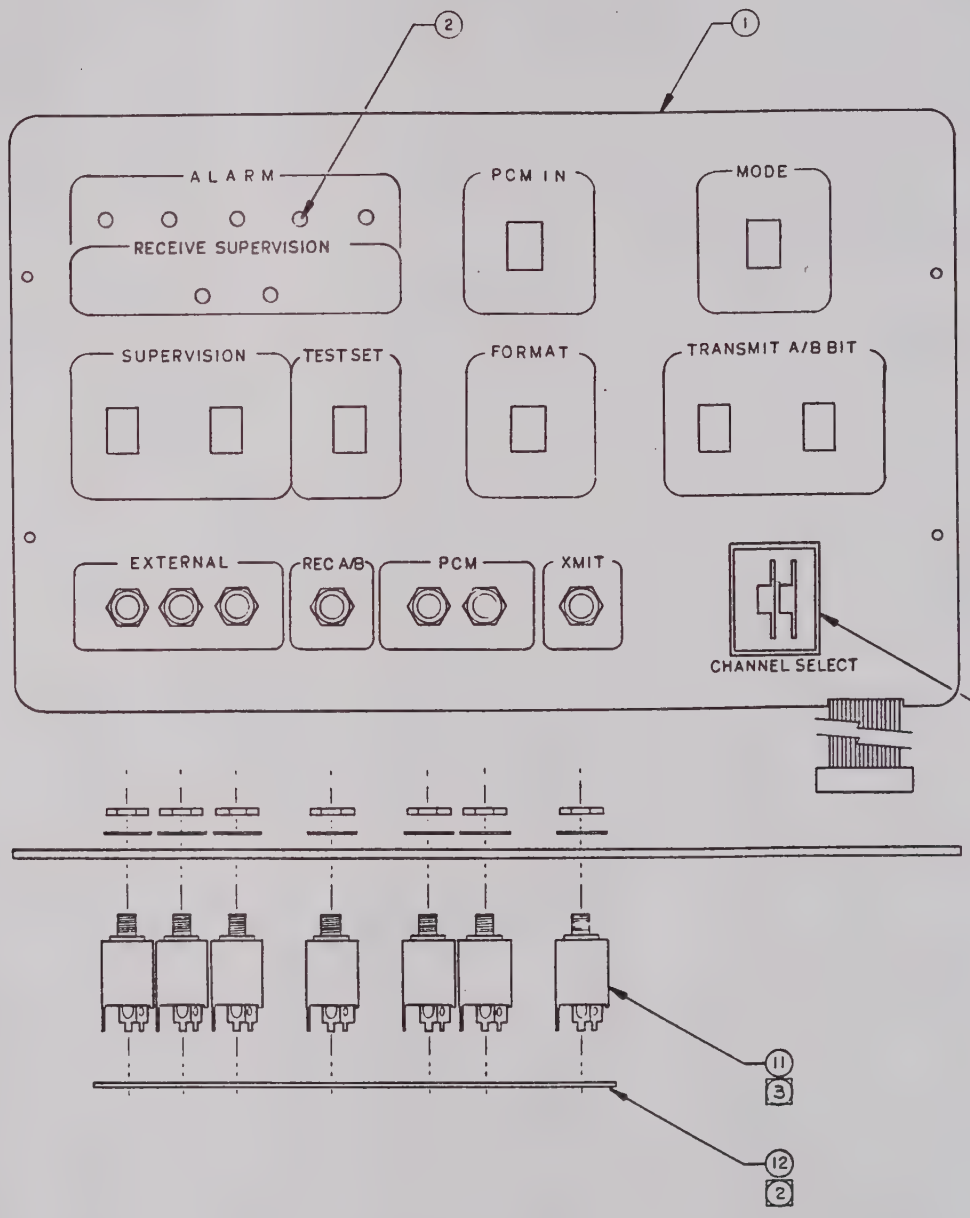
FINAL		966A5/6	1	
NEXT ASSY	QTY	USED ON		QTY
APPLICATION				

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.

3000-0101-02 REV C


DROP & INSERT
JACKBOARD
J1
J3 P3
BLU
GRN
YEL
ORN
RED
BRN
J2
BRN
RED
ORN
YEL
GRN
BLUE
VIO
GRY
WHT
BLK
J3
KEYBOARD
J1
DIGITAL BD
J2
MF/DTMF BD
BLK
RED
J2
LS1
BLU
GRN
YEL
ORG
RED
BRN
U8 PIN 15
U9 PIN 14
D GND
+5V
-12V
+12V
J4
RED
BLK
U1
PRINTER PORT BOARD
J1
J3
J2
OPTION 6


4
3
2
1
THIRD ANGLE PROJECTION
DUAL DIMENSIONING
FIELD USE INCH MM
LOCAL AND GENERAL NOTE USE INCH / MM
TABULATED DASH NUMBER(S)
NEXT B/M P/N(S)
QTY
E/C OR REVISION LEVEL
DATE
ENGINEER E/C APPROVAL
DATE
E/C OR REVISION LEVEL
DATE
ENGINEER E/C APPROVAL
DATE
A PRODUCTION RELEASE 7/21/86
B REV'D PER ECO 226 11/4/87
J5
A/C IN
L
N
E
E1
WHT
BLK
J2-2
P2-2
SW1
P2-1
J2-1
RED
F1
1A
250V
TR1
5 1 3 2 4
A AT A B BT B
GRN
YEL
PS1
5V
12V
-OUT
+OUT
-OUT
COM
+OUT
RED
GRN
YEL
BRN
BLU
ORN
P1
BRN
RED
ORN
YEL
GRN
BLU
15Ω, 2W
R1
BLK
YEL
FAN
B1
TR2
1 3 2 4
PS2
(48V)
(- OUT)
(+ OUT)
BLK
RED
J2 - 3
P2 - 3
J2-4
P2-4
RS 232
MATERIAL
FINISH
TOLERANCES
UNLESS OTHERWISE NOTED
U S
METRIC
XX ±
X ±
XXX ±
XX ±
ANGLES °
SIGN-OFF BY
INITIAL
DATE
DRAFTSPERSON RS 7-86
DRAFTING CHECKER EHZ 7/21/86
ENGINEER APPROVAL 7-21-86
PROJECT MANAGER
DRAFTING MANAGER 7/21/86
ENGINEERING MANAGER 9/10/86
BERRY ELECTRONICS
TITLE
PART BASIC WIRING DIAGRAM
PART DESCRIPTION 966A OPTIONS AND 6
P/N 3004-0101-01
D
THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITH OUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.
SCALE
(DO NOT SCALE DRAWING)
SHT 1 OF 1
DRAWING LEVEL
B
INCH
MM



5 SOLDER LEADS 3-6 TO J13 AND 1 & 2 TO S1 ON CIRCUIT SIDE OF KEYBOARD (ITEM 4) AS SHOWN PRIOR TO ASSY OF DS-1 ANALOG BD. (ITEM 22)

4 INSTALL RIBBON CABLE ASSY (ITEM 21) TO KEYBOARD (ITEM 4) PRIOR TO ASSY.

3 HARDWARE FURNISHED WITH JACKS.

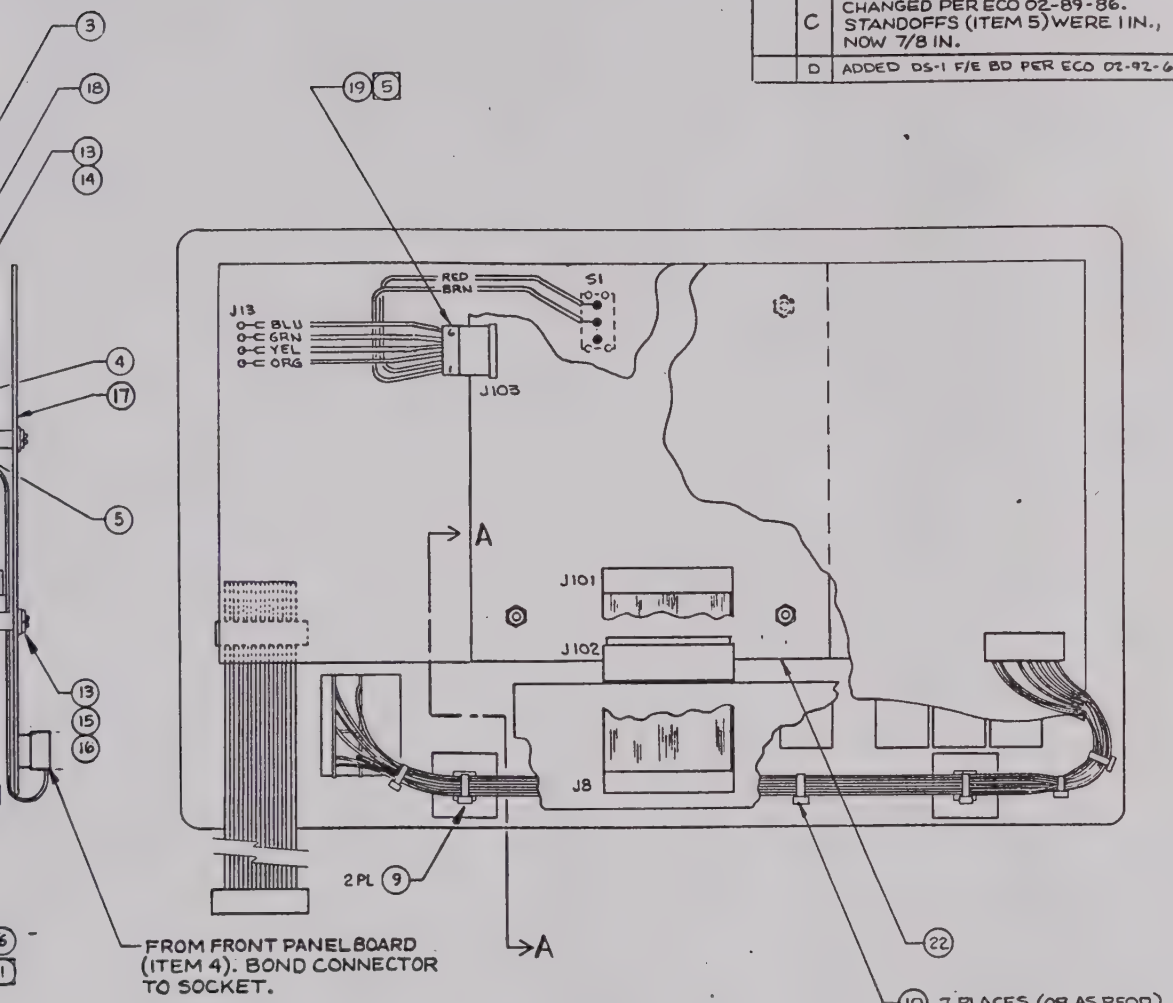
2 USING PC B. AS REFERENCE, POSITION JACKS (ITEM 11) INTO BOARD (ITEM 12). DO NOT SOLDER AT THIS TIME.

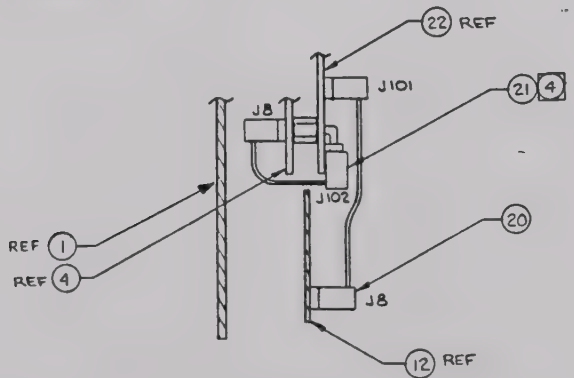
INSTALL JACKS AND JACK BOARD TO REAR OF PANEL (ITEM 1).
INSTALL JACK WASHERS AND NUTS, AND TIGHTEN AS REQUIRED.
CAUTION: JACKS TO BE TORQUED TO 6 LBS. MAXIMUM.
AFTER ALL JACKS ARE SECURED TO FRONT PANEL, SOLDER TO BOARD ASSEMBLY, BEING SURE BOARD ASSEMBLY IS SEATED ON JACK PINS.

1 INSTALL RIBBON CABLE ASSY (ITEM 6) TO KEYBOARD (ITEM 4) PRIOR TO ASSEMBLY. NOTICE POSITION OF CABLE TO BOARD.

NOTES: UNLESS OTHERWISE SPECIFIED:

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE.	7-17-86	
	B	CHANGED PER ECO 275.	11-1-88	KAC
	C	CHANGED PER ECO 02-89-86. STANDOFFS (ITEM 5) WERE 1 IN., NOW 7/8 IN.		KAC
	D	ADDED DS-1 F/E BD PER ECO 02-92-65	3-11-92	





SECTION A-A

FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.
3000-0101-02	1	96ALS	1		
3000-0101-01	1	96ALS	1		
3000-0104-01	1	314ALS	1		

LIST OF MATERIAL OR PARTS LIST

NEXT ASSY	QTY	USED ON	QTY
APPLICATION			

MATERIAL: SEE B/M

FINISH: ———

TOLERANCES (UNLESS OTHERWISE NOTED): U.S. / METRIC
XX ± / X ±
XXX ± / XX ±
ANGLES

SCALE | : |
(DO NOT SCALE DRAWING)

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	RS	7-18-86
DRAFTING CHECKER	ENZ	7/21/86
ENGINEER APPROVAL	[illegible]	7/[illegible]/86
PROJECT MANAGER	[illegible]	9/19/86
DRAFTING MANAGER	[illegible]	7/21/86
ENGINEERING MANAGER	[illegible]	7/[illegible]/86

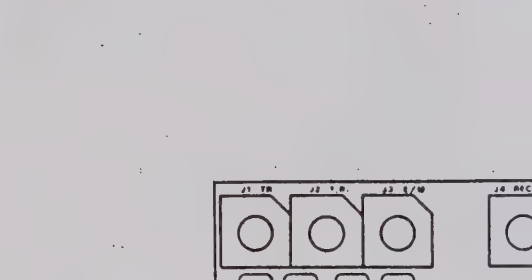
BERRY ELECTRONICS

DRAWING TITLE: ASSY, FRONT PANEL, DROP AND INSERT

D | DRAWING NO. 3000-0103-01 | REV D

SHEET 1 OF 1

3000-0103-01 REV D



3 FOR SCHEMATIC SEE 1904-0040-01

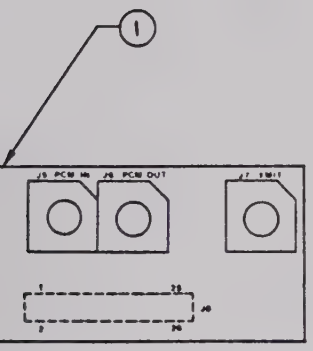
[2] RUBBER STAMP OR SILKSCREEN LATEST REV.

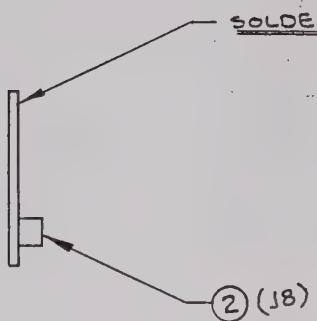
1. J1 - J7 ARE NOT TO BE INSTALLED AT THIS LEVEL

NOTES: UNLESS OTHERWISE SPECIFIED

3000-0103-01	
3000-0103-01	
NEXT ASSY	
AP	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	7-21-86	





FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

66ALS	1
14ALS	1
USED ON	QTY
ON	

MATERIAL: SEE B/M

FINISH:

TOLERANCES UNLESS OTHERWISE NOTED

U.S.		METRIC	
XX ±	—	X ±	—
XXX ±	—	XX ±	—
ANGLES °	—		—

SCALE 1/1 DO NOT SCALE DRAWING

THIS DRAWING CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS. THIS DRAWING IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS.

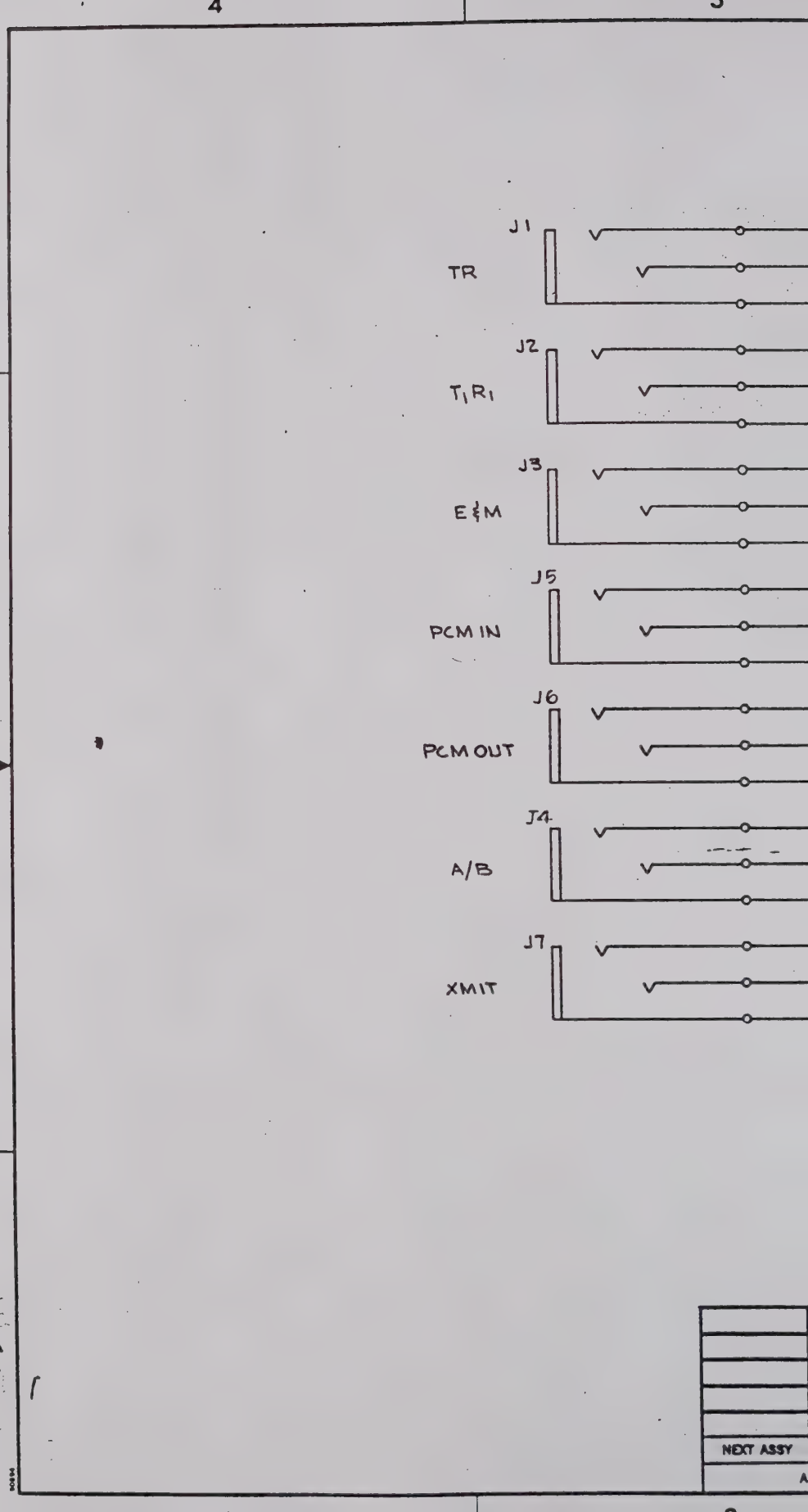
SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	VICKY	5/30/86
DRAFTING CHECKER	EHZ	7/21/86
ENGINEER APPROVAL		9/3/86
PROJECT MANAGER		8/19/86
DRAFTING MANAGER	EHZ	7/22/86
ENGINEERING MANAGER		9/10/86

BERRY ELECTRONICS

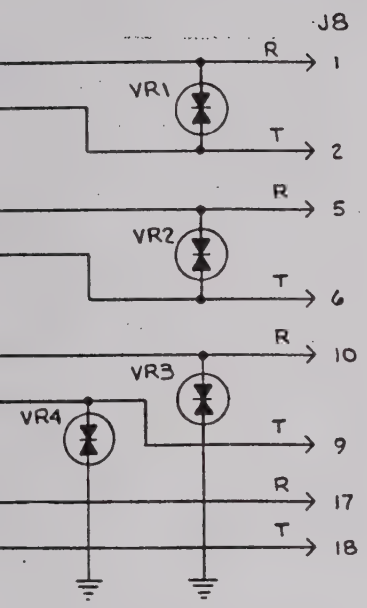
DRAWING TITLE: PCB ASSEMBLY, JACK, DROP AND INSERT

C | DRAWING NO. 1900-0040-01 | REV A

SHEET 1 OF 1


4
3
D
C
B
A
J1
TR
J2
T1R1
J3
E&M
J5
PCM IN
J6
PCM OUT
J4
A/B
J7
XMIT
NEXT ASSY

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	12-10-86	



R → 21
T → 22

R → 13
T → 14

R → 25
T → 26

→ 3,4,7,8,11,12,15,16,19,20,23,& 24
SLEEVE GND

FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

MATERIAL —

FINISH —

TOLERANCES (UNLESS OTHERWISE NOTED)

US		METRIC	
XX ±	—	X ±	
XXX ±	—	XX ±	
ANGLES °			

SCALE (DO NOT SCALE DRAWING)

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	EHZ	12/10/86
DRAFTING CHECKER		
ENGINEER APPROVAL		
PROJECT MANAGER		
DRAFTING MANAGER		
ENGINEERING MANAGER		

BERRY ELECTRONICS

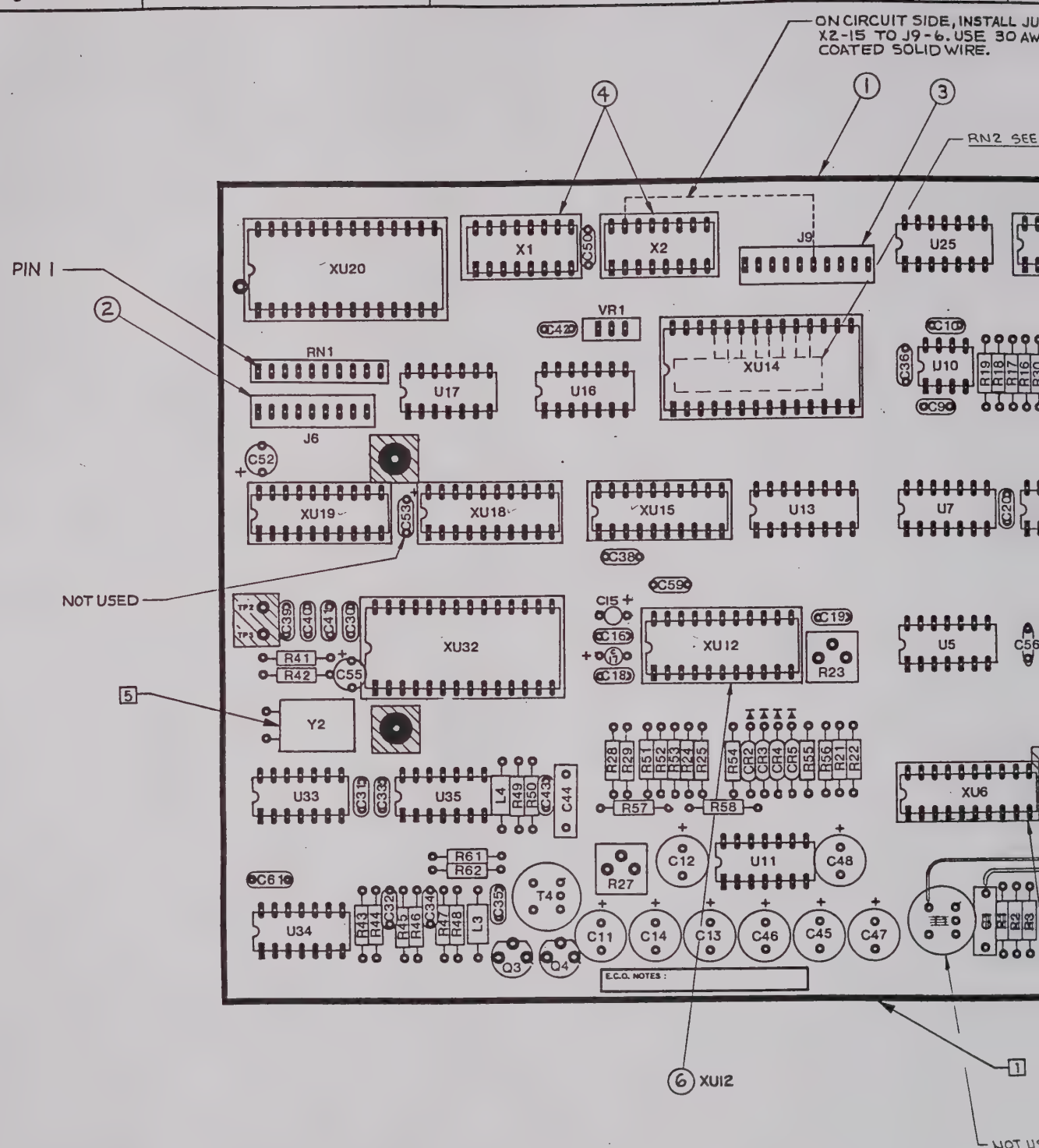
DRAWING TITLE
SCHEMATIC, JACK BOARD D/I

C | DRAWING NO. 1904-0040-01 | REV A

SHEET 1 OF 1

USED ON	QTY
966ALS	-

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.



NOTES: UNLESS OTHERWISE SPECIFIED.

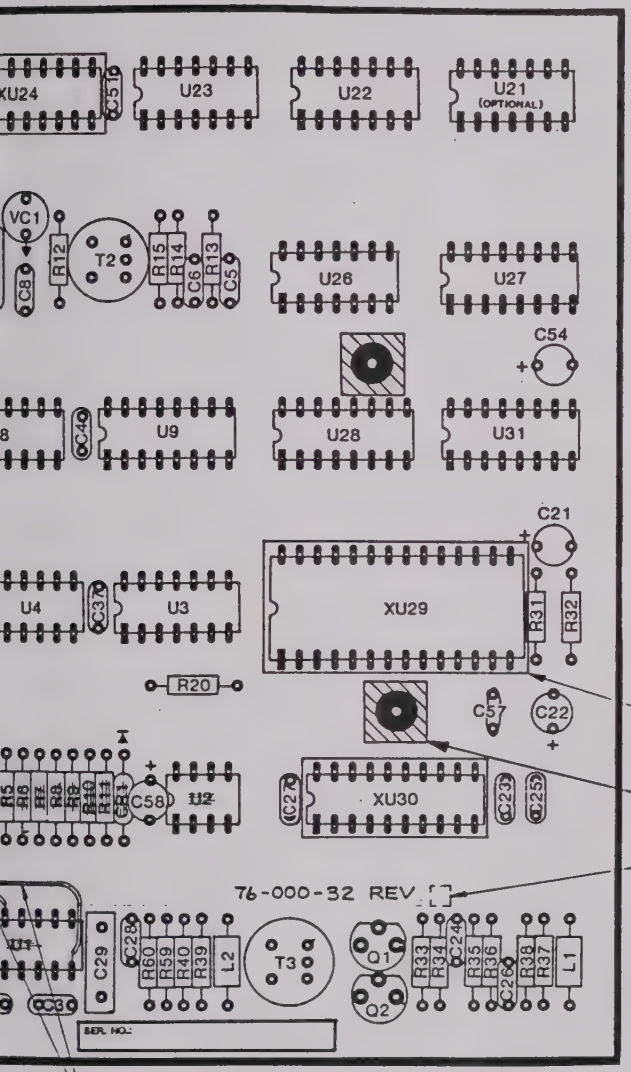
1. PC BOARD P/N: 72-50-090
2. REF. MATERIAL P/N:
   A. SCHEMATIC: SC 76-000-32
3. MAXIMUM COMPONENT HEIGHT: .600 .
4. SHIELD ALL SHADED AREAS FROM WAVE SOLDER ▨ .
5. SPOT BOND Y2 TO BOARD.
6. RUBBER STAMP LATEST REV APPROX WHERE SHOWN.
7. TRIM COMPONENT LEADS TO .060" FROM BOARD SURFACE TO END OF LEAD (EXCEPT I.C. LEADS.)

DWG. NO.	REV.
76-000-32	C

ER FROM
REEN TEFLON

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	PROD. RELEASE PER ECO 02-89-12	3-15-89	
	B	REVISED PER ECO 02-91-56	9-5-91	
	C	REVISED PER ECO 02-92-65	3-12-92	

TAIL A



7 XU14,20,29,32

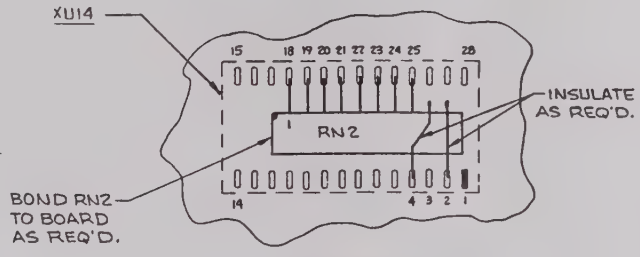
4 TYP.

6

INSTALL JUMPERS AS SHOWN.
USE 30 AWG GREEN TEFLON
COATED SOLID WIRE. SOLD TO BD.

XU6,15,18,19,24,30

T1, R1-11, CR1, C1, C2, C3, U1 (U2)



SOLDER SIDE

NOTE: SOLDER LEADS OF RN2 TO INDICATED PINS OF IC SOCKET LEADS ON CIRCUIT SIDE.

RN2 DETAIL A
USE ONLY IF ROCKWELL PART IS USED

QTY REQD	FSCM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE.
FRACTIONS ± ____ DECIMALS .XX ± ____ .XXX ± ____ ANGLES ± ____

MATERIAL SEE B.O.M.

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN HR	8/12/87
CHECKED HFI	8/18/87
ISSUED	

CSE TECHNOLOGIES, INC.
NEW LONDON, MN

PCB ASSEMBLY,
MAIN BOARD, 8407

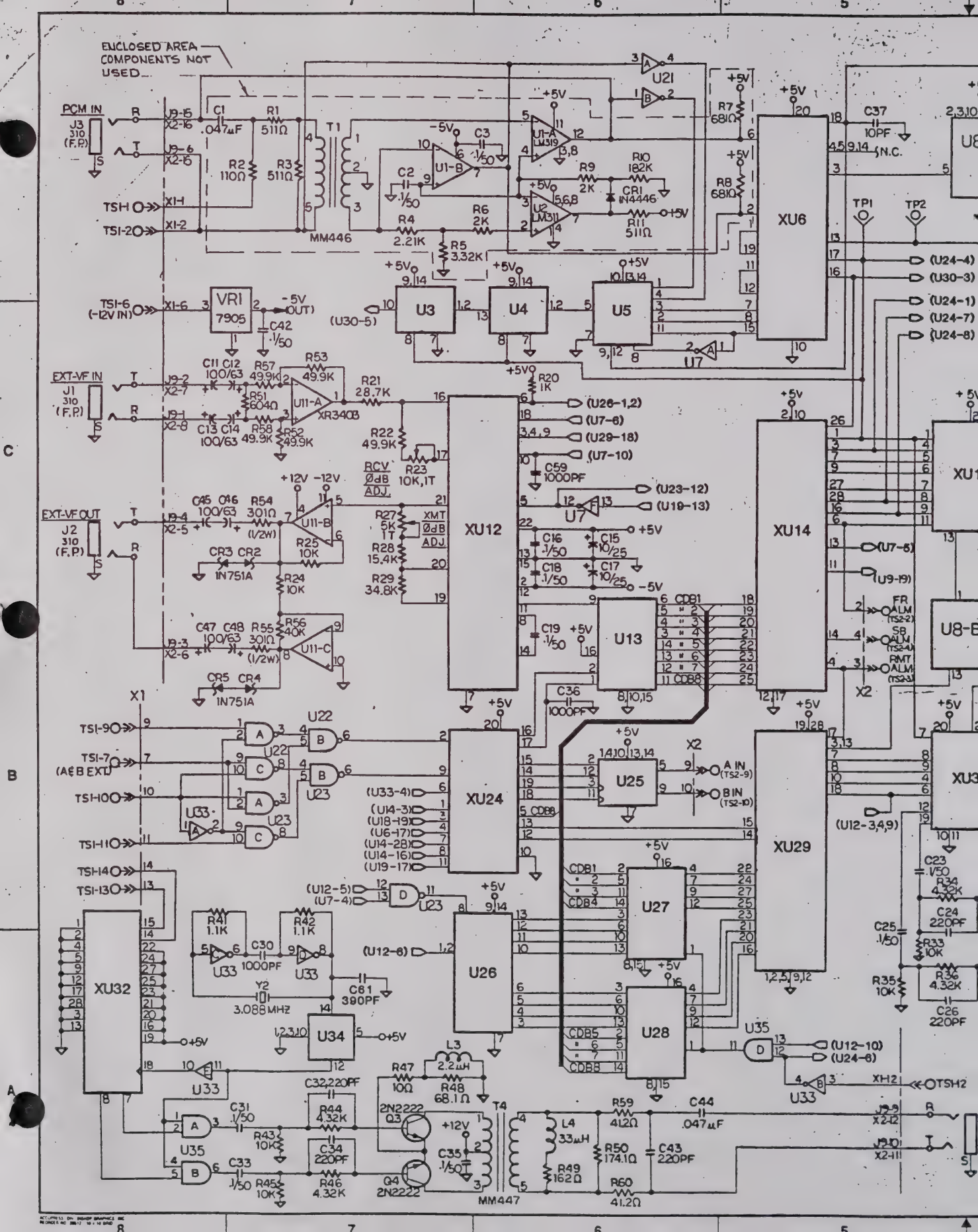
SIZE	FSCM NO.	DWG. NO.	REV.
D		76-000-32	C

SCALE ____ SHEET 1 OF 1

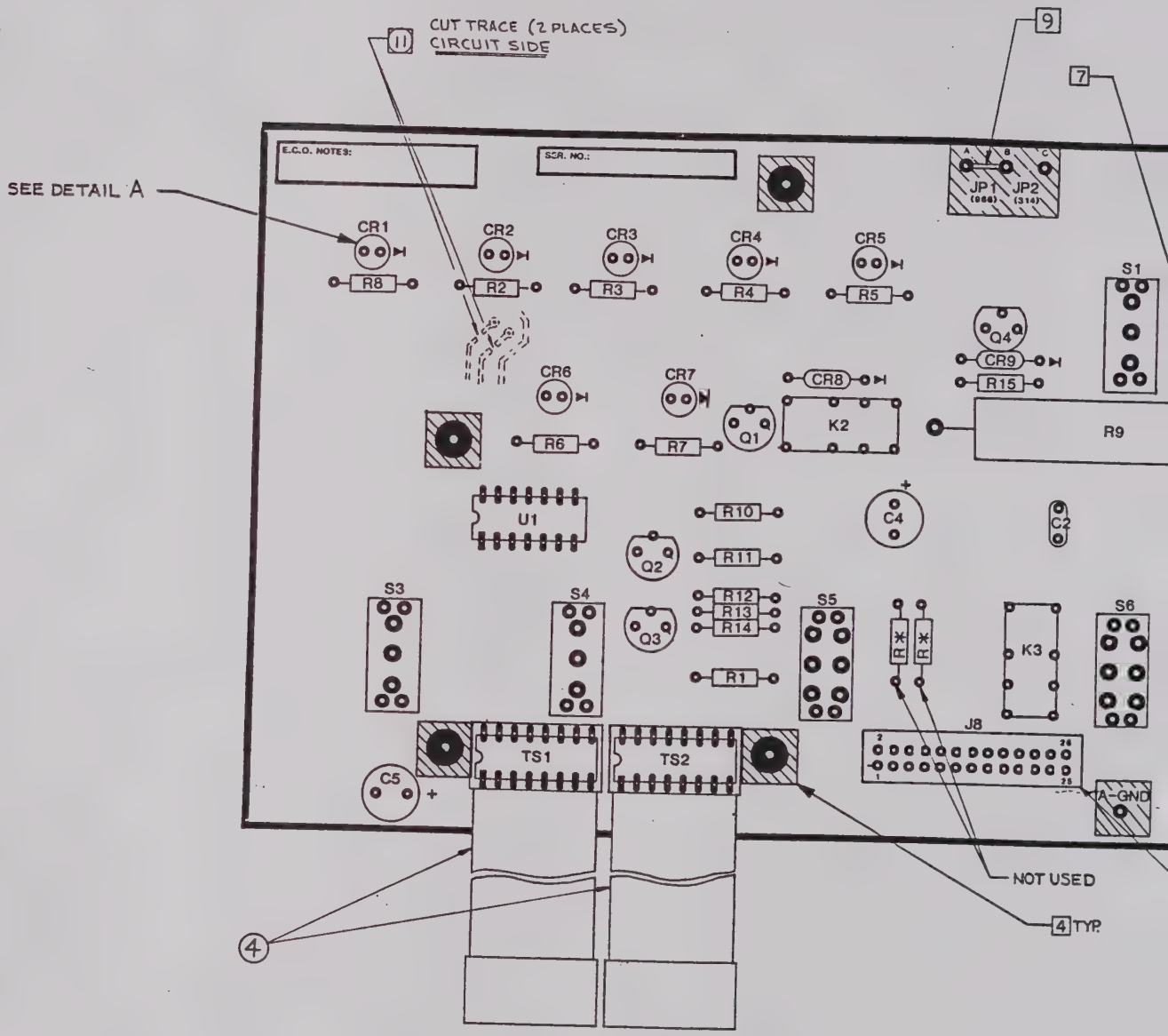
NEXT ASSY	USED ON
3000-0103-01	3I4AL5,966AL5

APPLICATION

REF ACT
6100-1004-5021
REV D

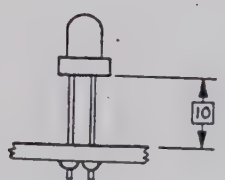

ENCLOSED AREA COMPONENTS NOT USED
PCM IN
J3 310 (F.P)
EXT-VF IN
J1 310 (F.P)
EXT-VF OUT
J2 310 (F.P)
TSH-O
TSI-2O
TSI-6 (-12V IN)O
TSI-9O
TSI-7 (A≠B EXT)
TSH-10O
TSI-11O
TSH-14O
TSH-13O
TSH2
MM446
MM447
VR1 7905
XR3403
XU1-A LM319
XU2 LM311
XU6
XU12
XU14
XU24
XU26
XU27
XU28
XU29
XU32
U3
U4
U5
U7
U8
U13
U21
U22
U23
U25
U33
U34
U35
T1
T4
Y2 3.088 MHz
TP1
TP2
FR ALM (TS2-2)
SB ALM (TS2-4)
RMT ALM (TS2-3)
A IN (TS2-9)
B IN (TS2-10)
RCV ØdB ADJ.
XMT ØdB ADJ.
2N2222
IN751A
IN4446
+5V
-5V
+12V
-12V
N.C.

DWG. NO. SC 76-000-32
SH 1
REV C
REVISIONS
ZONE | REV. | DESCRIPTION | DATE | APPROVED
A | PROD. RELEASE PER ECO 02-89-12 | 3-15-89
B | REVISED PER ECO 02-91-56 | 9-5-91
C | DELETED CIRCUITRY D8,7,6 ECO 02-92-65 | 3-12-92
NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTORS ARE M.F., 1%.
2. LAST REF. DESIG. USED: TP3, T4, J9, X2, RN1, VC1, U35, CR5, C61, R62.
3. UNUSED REF. DESIG.: R51, J7, J8, C7, C49.
U9
U10 LM360
U7
U16
U17
U31
XU18
XU19
XU20
U35 74LS08 7 14 14
U7,33 74LS04 7 14 14
U31 74HC123 1,8 3,16 16
U30 6000-1006 10,11 20 20
U32 R8050 9 19 28
U29 6002-1000 9 19 28
U27,28 74HC157 8 16 16
U25 74HC74 7 14 14
U24 6000-1015 10 20 20
U22,23 74HC00 7 14 14
U20 6001-1005 14,20,22 1,27,28 28
U19 6000-1014 10 20 20
U18 6000-1013 10 20 20
U17,34 74LS93 10 5 14
U16 74LS92 10 5 14
U15 6000-1005 10 20 20
U14 6002-1001 12,17 2,10 28
U13 74HC165 8 16 16
U12 S3507 7 22 22
U11 XR3403 14
U10 LM360 5 8 8
U8,9 74LS221 8 16 16
U21 74HC04 7 14 14
U6 6000-1012 10 20 20
U5 74107 7 10,13,14 14
U3,4,26 74HC164 7 9,14 14
U2 LM311 1,4 5,6,8 8
U1 LM319 3,8 11 14
REF. DESIG | TYPE | GND | +5V | NO. OF PINS
IC. DEVICE TABLE
PARTS LIST
CSE TECHNOLOGIES, INC.
NEW LONDON, MN.
SCHEMATIC, MAIN BOARD, 8407
SC 76-000-32
SIZE D
REV C
SHEET 1 OF 1
DO NOT SCALE DRAWING



NOTES: UNLESS OTHERWISE SPECIFIED.

1. PC BOARD P/N: 72-50-091
2. REF. MATERIAL P/N:
   A. SCHEMATICS: SC 76-000-33
3. MAXIMUM COMPONENT HEIGHT: .900.
4. SHIELD ALL SHADED AREAS FROM WAVE SOLDER ▨.
5. RUBBER STAMP LATEST REV APPROX WHERE SHOWN.
6. LOAD J7 SO THAT PIN 1 WILL MATCH WITH PIN 16 ON THE BOARD.
7. KEEP R9'S LEADS BENT AND .600 FROM BOARD AS SHOWN IN DETAIL B.
8. TRIM COMPONENT LEADS TO .060" FROM BOARD SURFACE TO END OF LEAD (EXCEPT I.C. LEADS).
9. SOLDER BUSS WIRE TO PADS A & B AS SHOWN.
10. AFTER FLOW SOLDERING USE FRONT PANEL (72-71-121) AS A FIXTURE TO INSTALL LED'S CR1-CR7. LED'S SHOULD BE PRESSED INTO LED BUSHING TO SET HEIGHT.
11. PRIOR TO ASSY, CUT TRACES AT VIA AS SHOWN (CIRCUIT SIDE) 2 PLACES

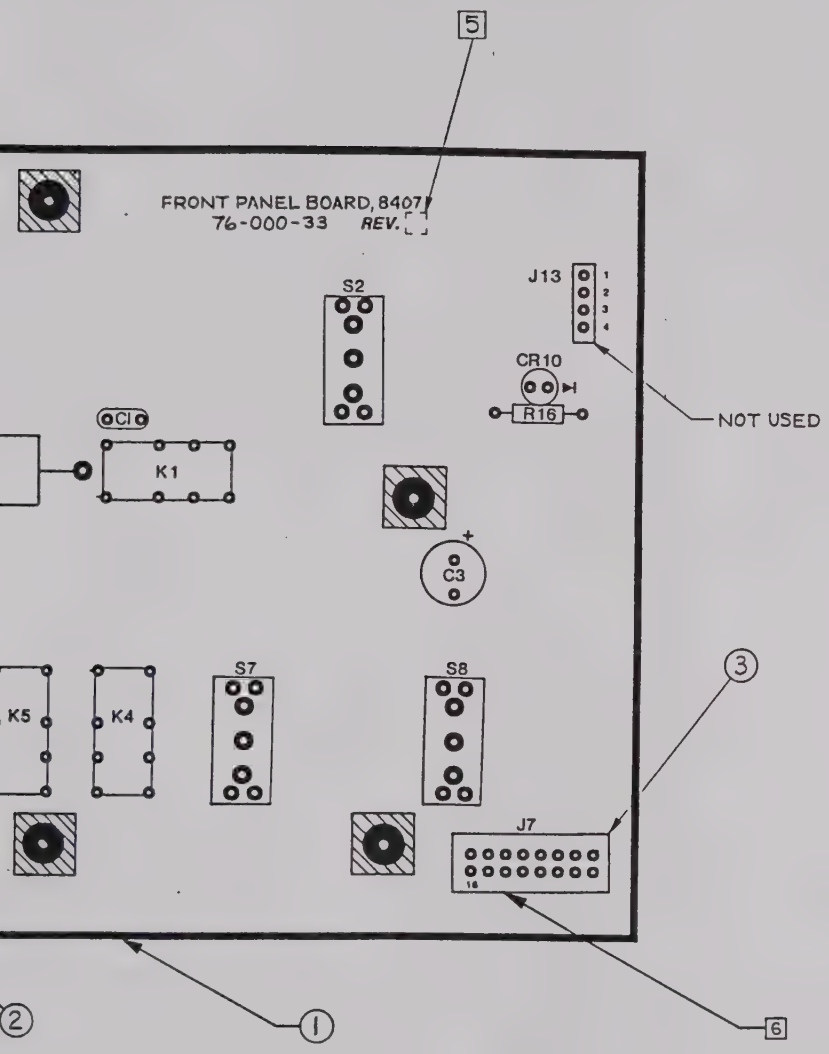


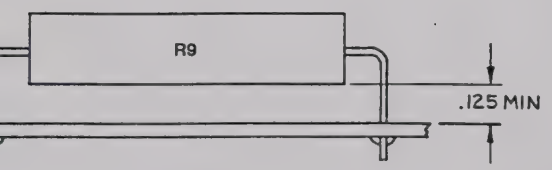
DETAIL A
SCALE: NONE
7 PLCS (CR1-CR7)

76-000-33	1	B		1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	PROD. RELEASE PER ECO 02-89-12	3-15-89	
	B	CUT TRACES, NOTE 11 ECO 02-92-65	3-12-92	





DETAIL B
SCALE: NONE

QTY REQD	FSCM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN KAC	11/1/98
CHECKED	
ISSUED	

CSE TECHNOLOGIES, INC.
NEW LONDON, MN

PCB ASSEMBLY,
FRONT PANEL BOARD, 8407

SIZE D | FSCM NO. | DWG. NO. 76-000-33 | REV. B

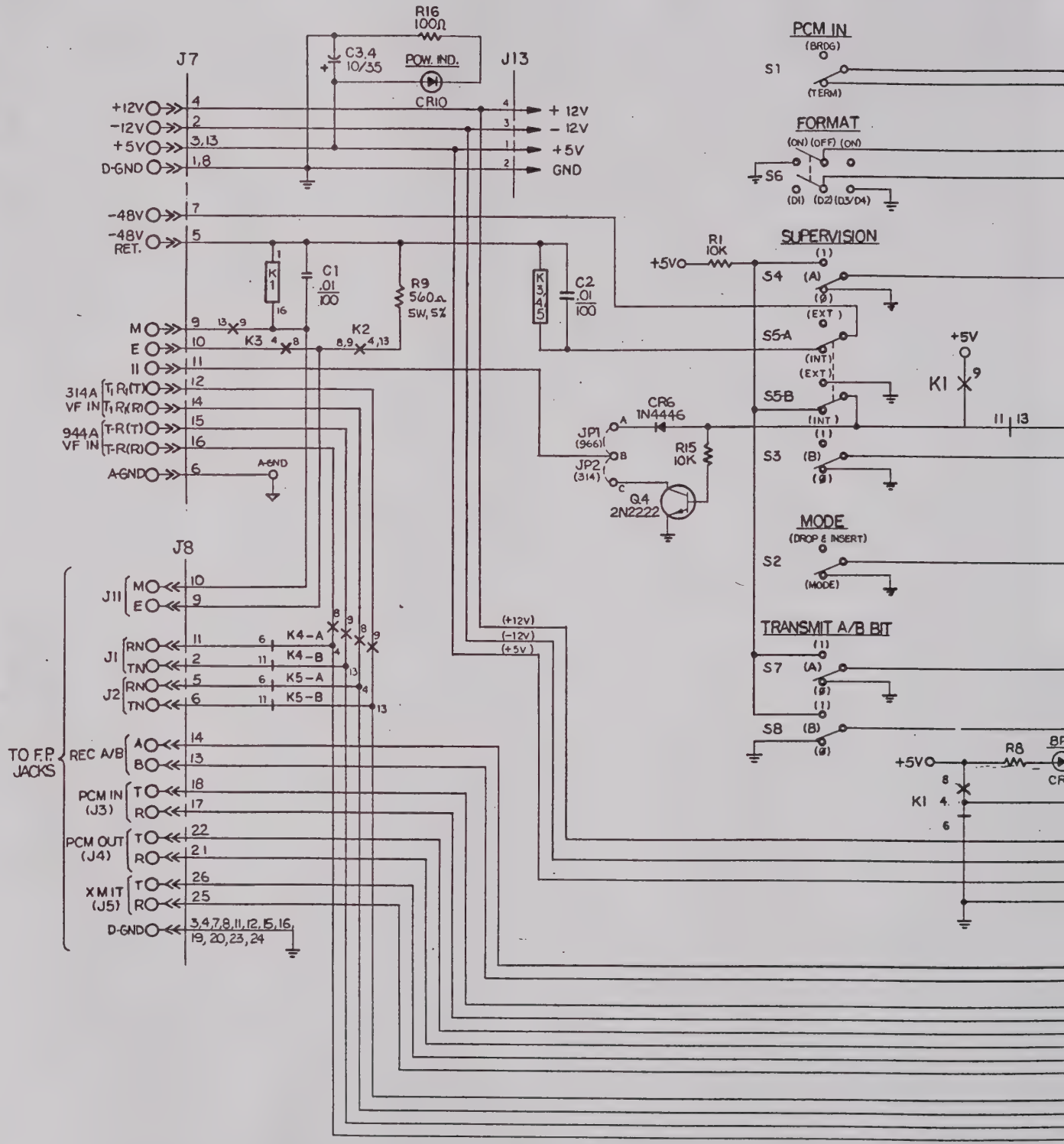
SCALE | SHEET 1 OF 1

3000-0103-0[illegible]14AL5, 966AL5	
NEXT ASSY	USED ON
APPLICATION	

REF ACT GICO-1004-5022 REV D

4 3 2 1

D C B A

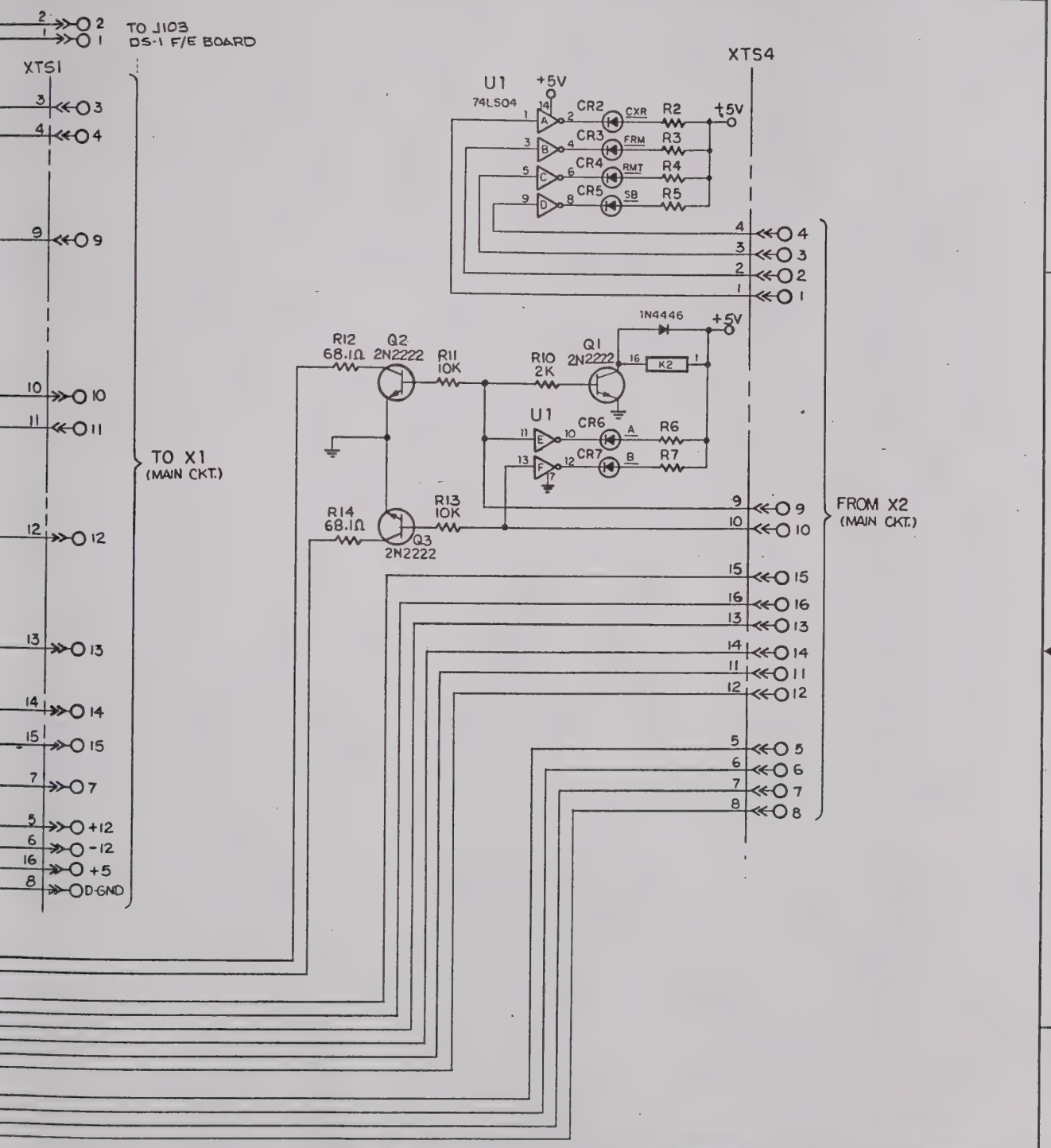


NOTES: UNLESS OTHERWISE SPECIFIED.

1. RESISTORS (R2-R8) ARE 100Ω, 1%.
2. ALL RELAYS ARE 2 FORM C.
3. LAST REF. DESIG. USED: U1, K5, S8, TS2, J12, C5, CR10, R15.
4. UNUSED REF DESIG.: J1-J6.

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	PROD. RELEASE PER ECO 02-89-12	3-15-89	
	B	CHG "S1" CIRCUIT HOOK-UP ECO 02-92-65	3-12-92	



QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± ____ DECIMALS .XX ± ____ .XXX ± ____ ANGLES ± ____

MATERIAL

FINISH

NEXT ASSY | USED ON

APPLICATION

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN PH. NG.	6/10/86
CHECKED MPC	6/10/86
ISSUED	

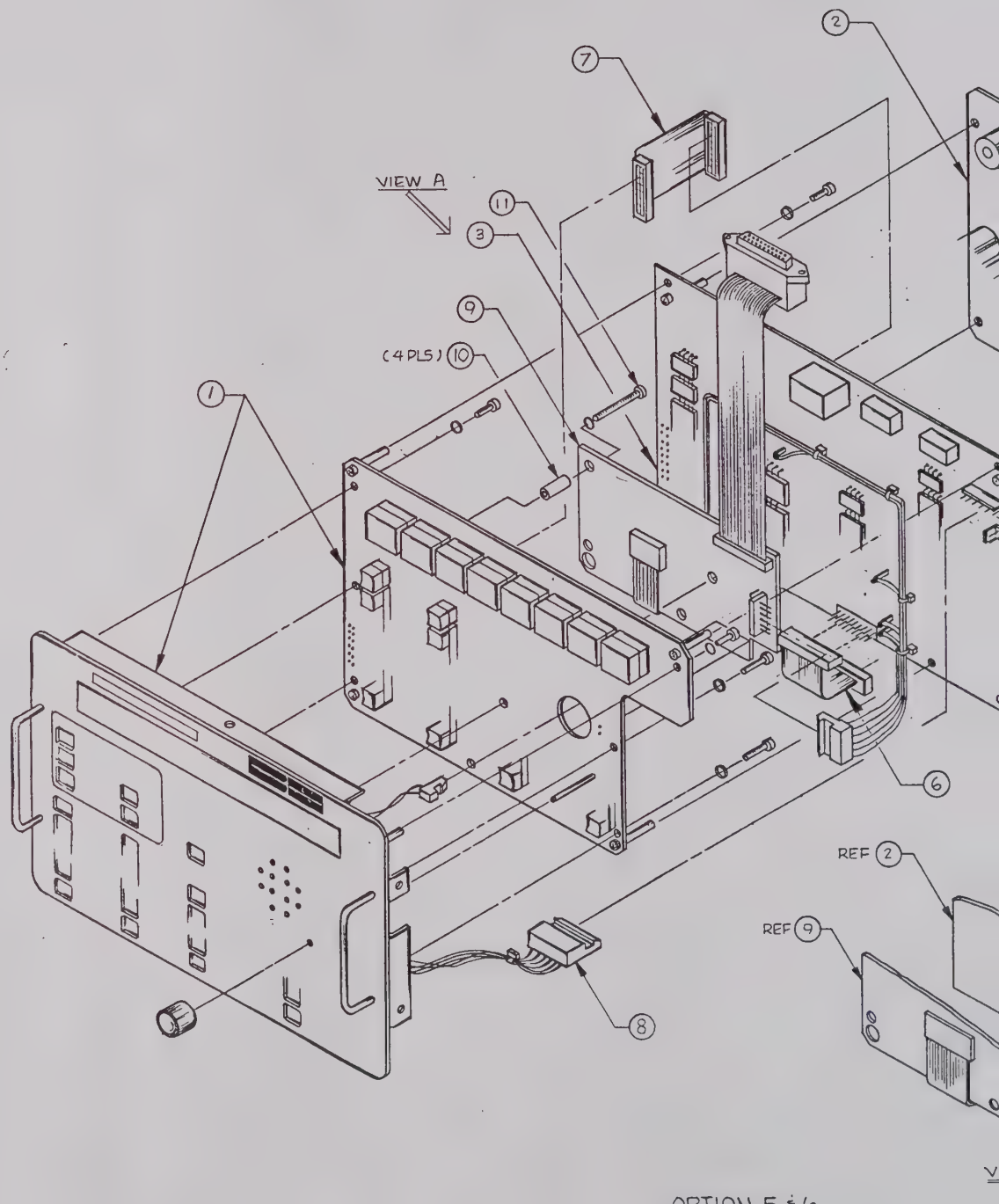
CSE TECHNOLOGIES, INC.
NEW LONDON, MN.

SCHEMATIC, FRONT PANEL BOARD, 8407

SIZE D | FSCM NO. | DWG. NO. SC 76-000-33 | REV B

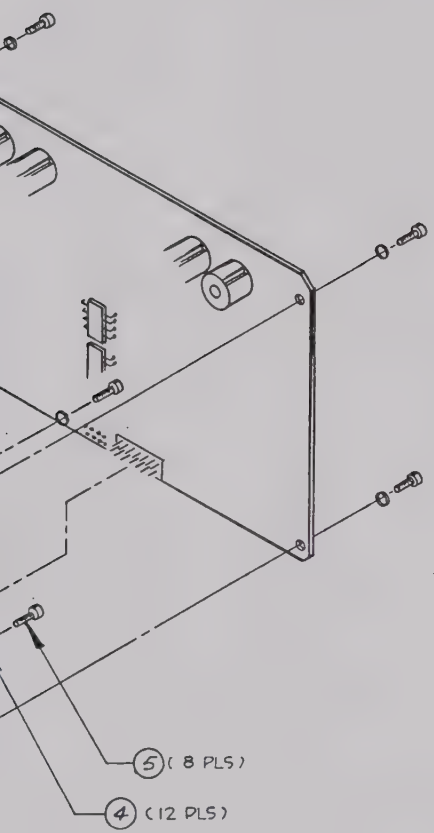
SCALE — | SHEET 1 OF 1

REF ACT
8 8407-00-001 REV B



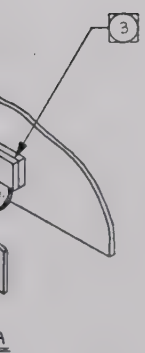
OPTION 5 & 6

THIRD ANGLE PROJECTION	TABULATED DASH NUMBER(S)	NEXT B/M P/N(S)	QTY	E/C OR REVISION LEVEL	DATE	ENGINEER E/C APPROVAL	DATE	E/C OR REVISION LEVEL	DATE	ENGINEER E/C APPROVAL	DATE
DUAL DIMENSIONING FIELD USE — INCH / MM LOCAL AND GENERAL NOTE USE — INCH / MM				(SEE SHEET 1)							



NOTES: UNLESS OTHERWISE SPECIFIED

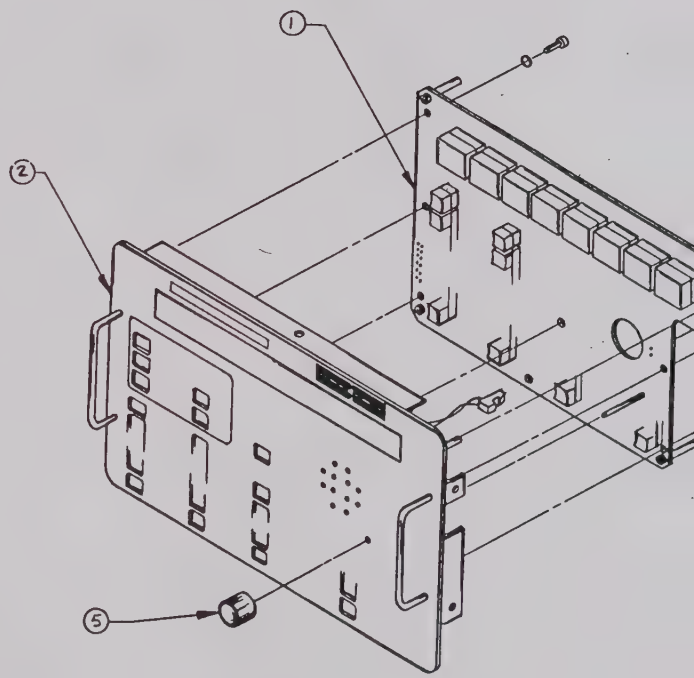
1. TAG WITH BERRY PART NO.- LATEST REV.
2. ITEM (1) SHOWN APART FOR CLARITY.
3. SPOT BOND CONNECTOR (72-30-044) TO SOCKET (0700-0028-01) AS REQ'D



NEXT ASSY 3000-0101-03

MATERIAL	TOLERANCES (UNLESS OTHERWISE NOTED)				SIGN-OFF BY	INITIAL	DATE	BERRY ELECTRONICS
SEE B/M	U.S.		METRIC		DRAFTSPERSON	RS	8/86	
FINISH	XX ±	—	XX	—	DRAFTING CHECKER	ENG.	9/2/86	TITLE PART BASIC ASSY TOP MODULE 966A OPTION 5 & 6
	XXX ±	—	XXX ±	—	ENGINEER APPROVAL		9/10/86	
	ANGLES ±	—			PROJECT MANAGER			
THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.	SCALE 1/2 (DO NOT SCALE DRAWING)		DRAWING LEVEL E		DRAFTING MANAGER	[illegible]	9/21/86	D P/N 3000-0100-02
	SHT 2 OF 2				ENGINEERING MANAGER	[illegible]	9/10/86	

INCH / MM

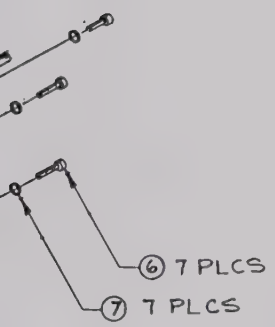


3000-0100-02
3000-0100-01
NEXT ASSY
A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	7-28-86	
	B	REVISED PER ECO 02-91-50	5-6-91	

NOTES: UNLESS OTHERWISE SPECIFIED

1. TAG COMPLETED ASSY WITH BERRY PART NO. & REV.



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.
				LIST OF MATERIAL OR PARTS LIST	

USED ON	QTY
966ALS	1
966ALS	1

MATERIAL: SEE B/M

FINISH: ———//———

TOLERANCES (UNLESS OTHERWISE NOTED)

US		METRIC	
XX ±	- .# -	X ±	
XXX ±	—#—	XX ±	
ANGLES ±	- .# -		

SCALE NONE (DO NOT SCALE DRAWING)

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	R.S.	6/12/86
DRAFTING CHECKER	EHL	8/21/86
ENGINEER APPROVAL	RP	9/14/86
PROJECT MANAGER		
DRAFTING MANAGER	EHL	8/21/86
ENGINEERING MANAGER	T.H.	9/14/86

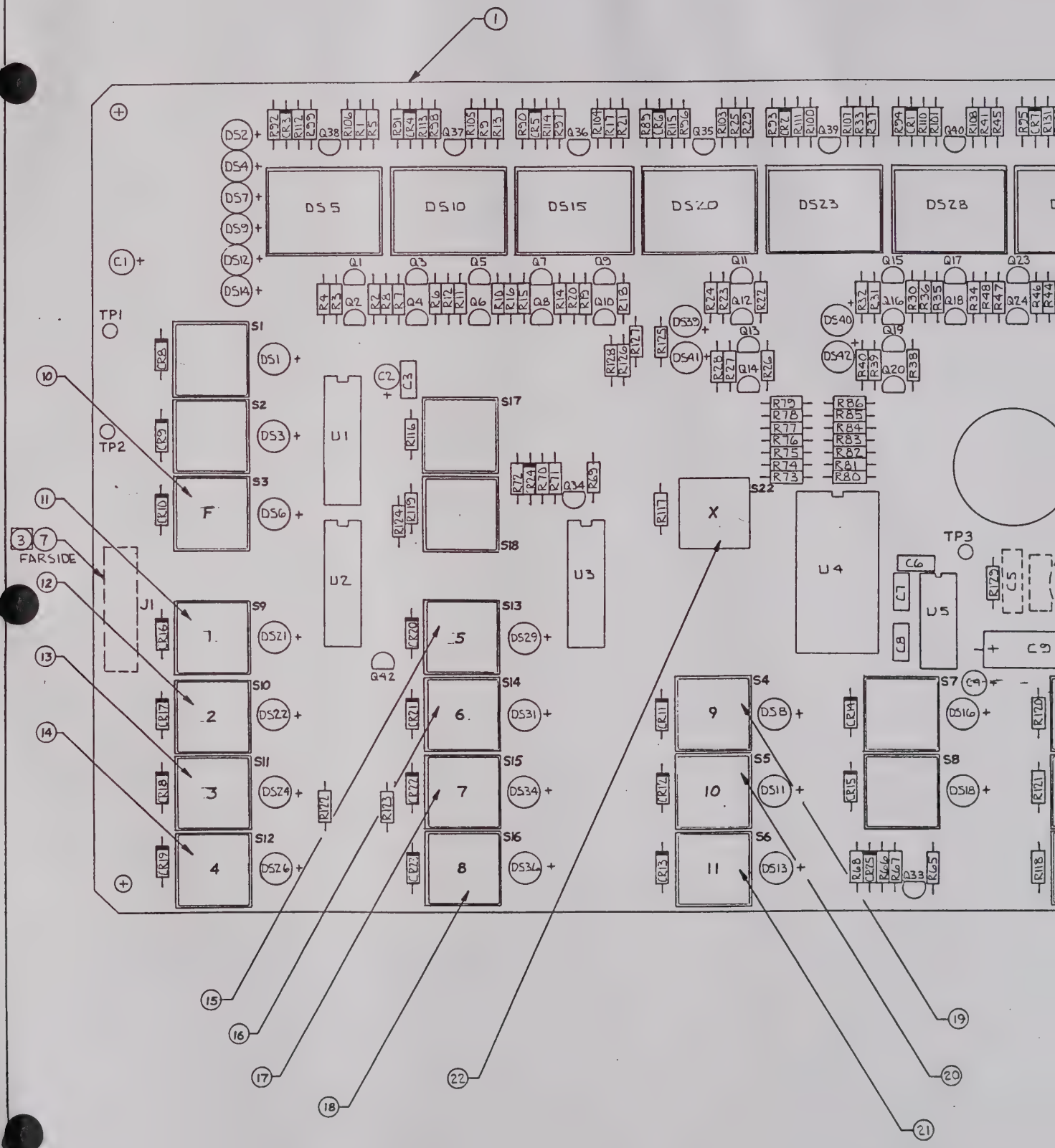
BERRY ELECTRONICS

DRAWING TITLE: ASSY, FRONT PANEL MODULE 966ALS

C | DRAWING NO. 3000-0099-01 | REV B

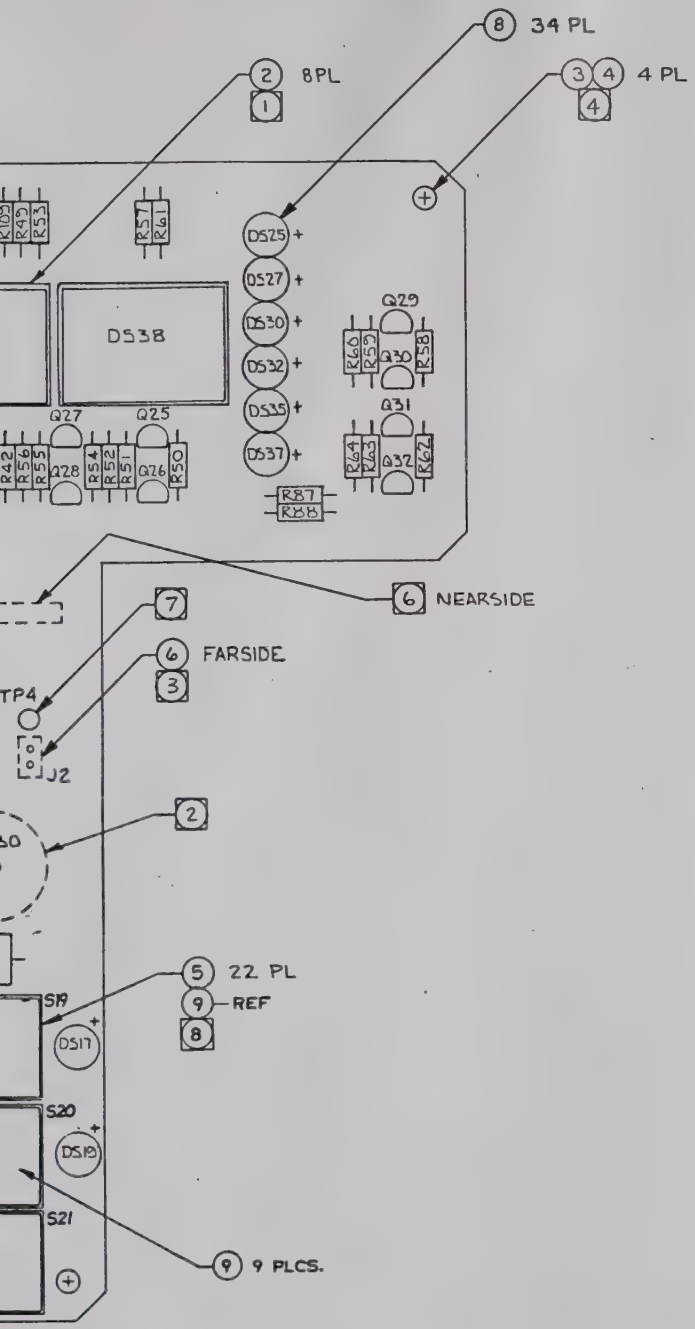
SHEET 1 OF 1

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC



PRINTED ON NO 100GM - S CLEARPRINT FADE-OUT

		REV A	MAR. 84
		REVA-3	9/84
B	REV PER ECO 102		4/11/85
C	ADDED FEATURE GROUP/ ECO 130		5.2.85
D	ADDED NOTE 8/ ECO 138		9/17/85
E	REVISED PER ECO 176		4/11/86
F	REV'D PER ECO 02-89-17		4/20/89
G	REV'D PER ECO 02-92-66		6-29-92



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. DO NOT INSTALL DS 5, 10, 15, 20, 23, 28, 33 & 38 IN SOCKETS UNTIL AFTER WAVE SOLDERING.
2. DO NOT INSTALL R130 OR C5 ON FARSIDE OF BOARD UNTIL AFTER WAVE SOLDERING.
3. INSTALL J1 & J2 ON FARSIDE OF BOARD AFTER WAVE SOLDERING.
4. USE LOCTITE NO. 242 ON THREADS AS REQ'D.
5. TRIM COMPONENT LEADS TO .060 INCH FROM BOARD SURFACE TO END OF LEAD EXCEPT I. C. LEADS.
6. RUBBER STAMP LATEST ASSY DWG REVISION LETTER WHERE SHOWN.
7. POSITION "TP4" DOES NOT RECEIVE A TEST POINT TERMINAL. SOLDER MASK HOLE BEFORE WAVE SOLDERING.
8. ENSURE THAT SWITCHES S1 THRU S22 ARE INSTALLED SO THAT THEIR EDGES ALIGN WITH EACH OTHER AND ARE SQUARE WITH THE EDGES OF THE PC BOARD.

966 A FEATURE GROUP D

BERRY ELECTRONICS, INC.

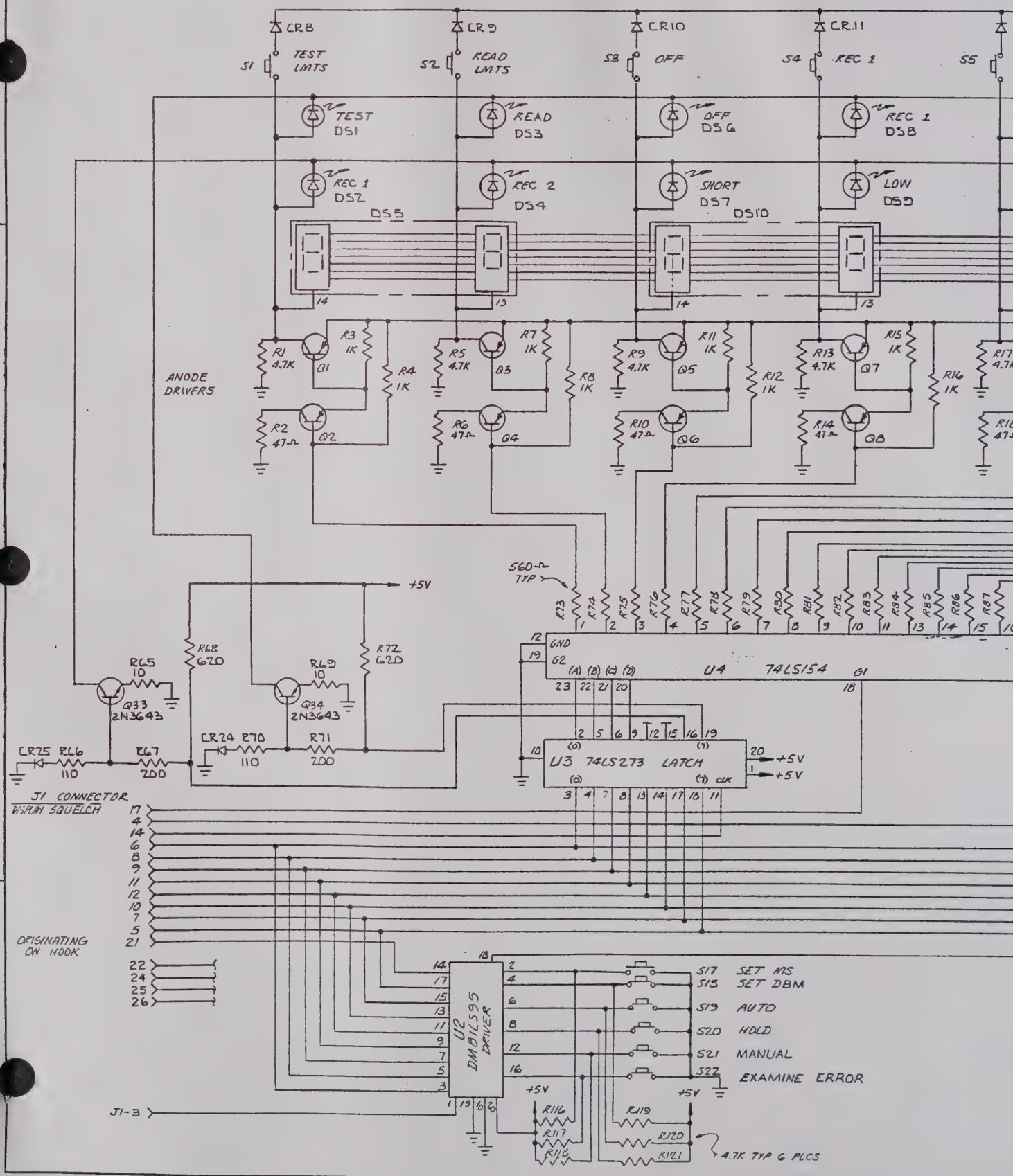
SCALE: 2/1 | APPROVED BY: | DRAWN BY: JSCOTT

DATE: | REVISED

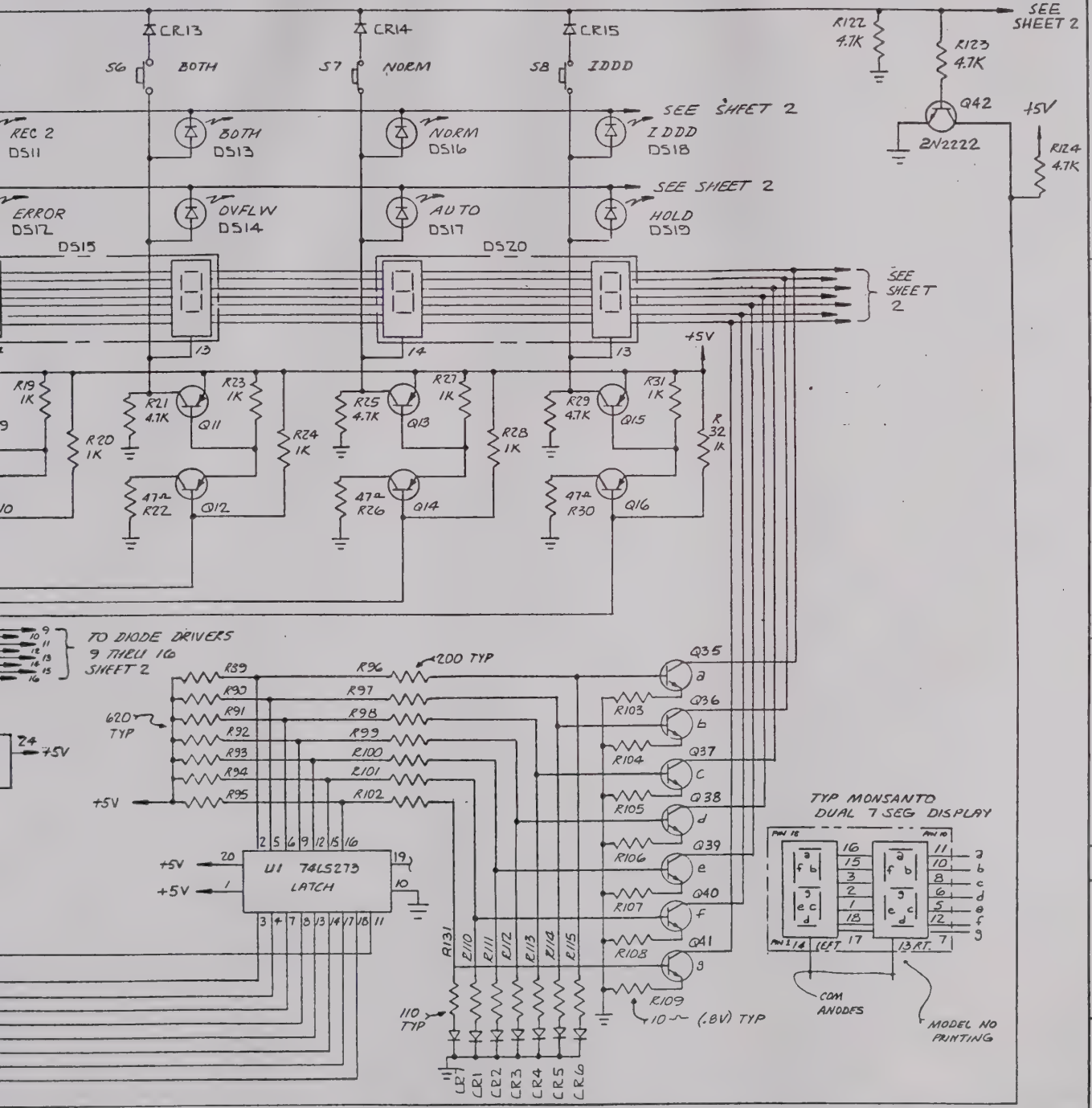
ASSEMBLY DRAWING
966A KEYBOARD / DISPLAY BOARD

1902-0004-01 REV G

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION THAT MAY NOT BE DISCLOSED TO OTHERS, REPRODUCED OR USED WITHOUT WRITTEN AUTHORITY



REVISIONS				REV A 2FEB'84
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		A-3	9/84	
	B	REV'D PER ECO 102	4/11/85	C.F.



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	SPECIFICATION

LIST OF MATERIAL OR PARTS LIST

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES

TOLERANCES ON: DECIMALS XX ± XXX ± ANGLES ± FRACTIONS ±

MATL

FINISH

NEXT ASSY	QTY	USED ON	QTY
		966A	

APPLICATION

CONTRACT NO.

		DATE
DRN	J.SCOTT	4-23-81
CHK		DATE
APP		DATE

BERRY ELECTRONICS, INC.

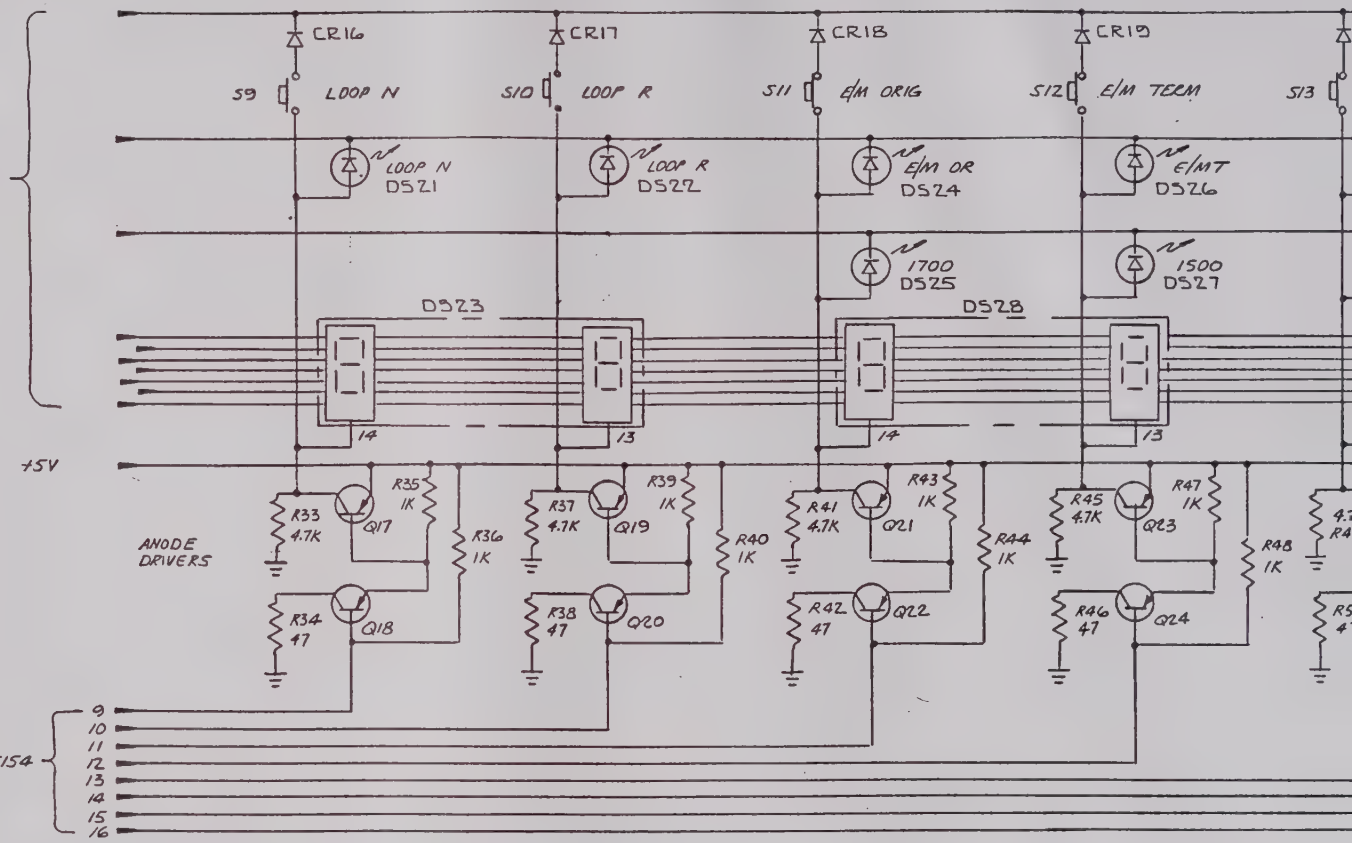
DRAWING TITLE

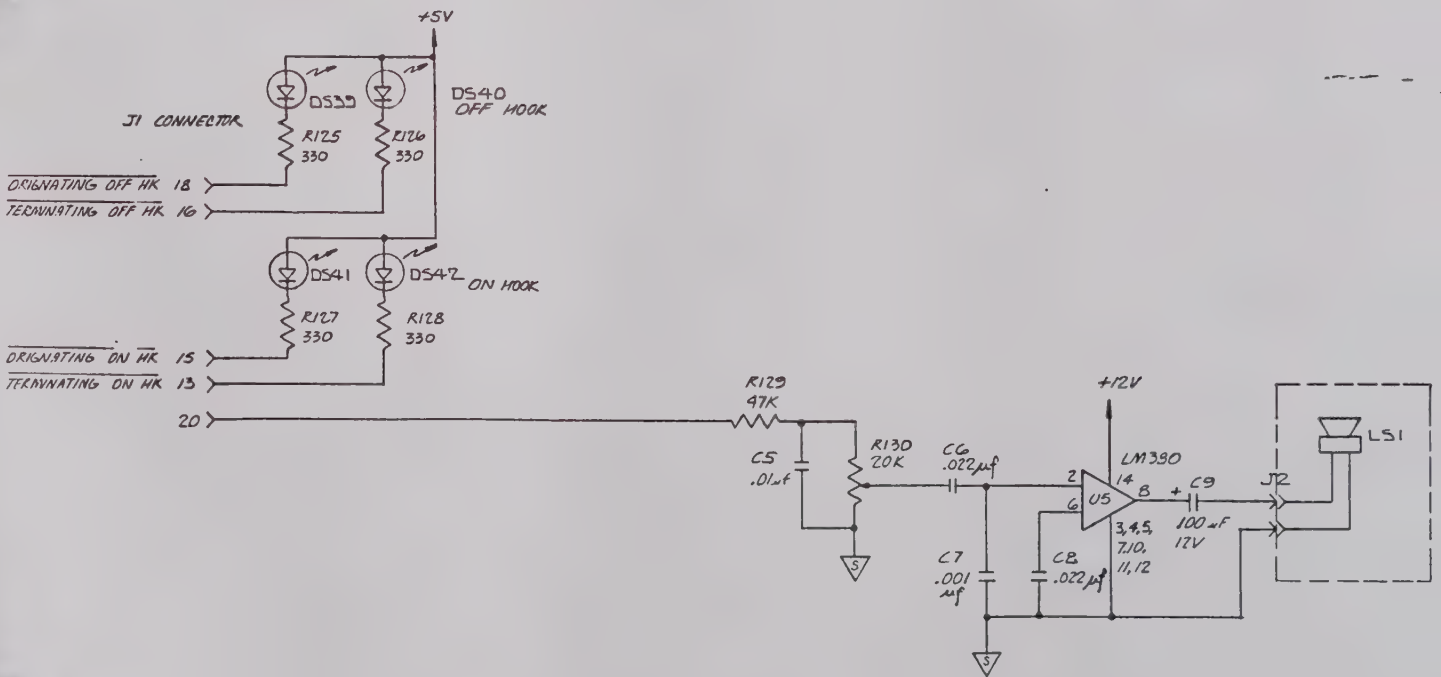
SCHEMATIC DRAWING
966A KEYBOARD/DISPLAY

SIZE	CODE IDENT	DRAWING NO.	REV
D	[redacted]	1304-0004-01	B

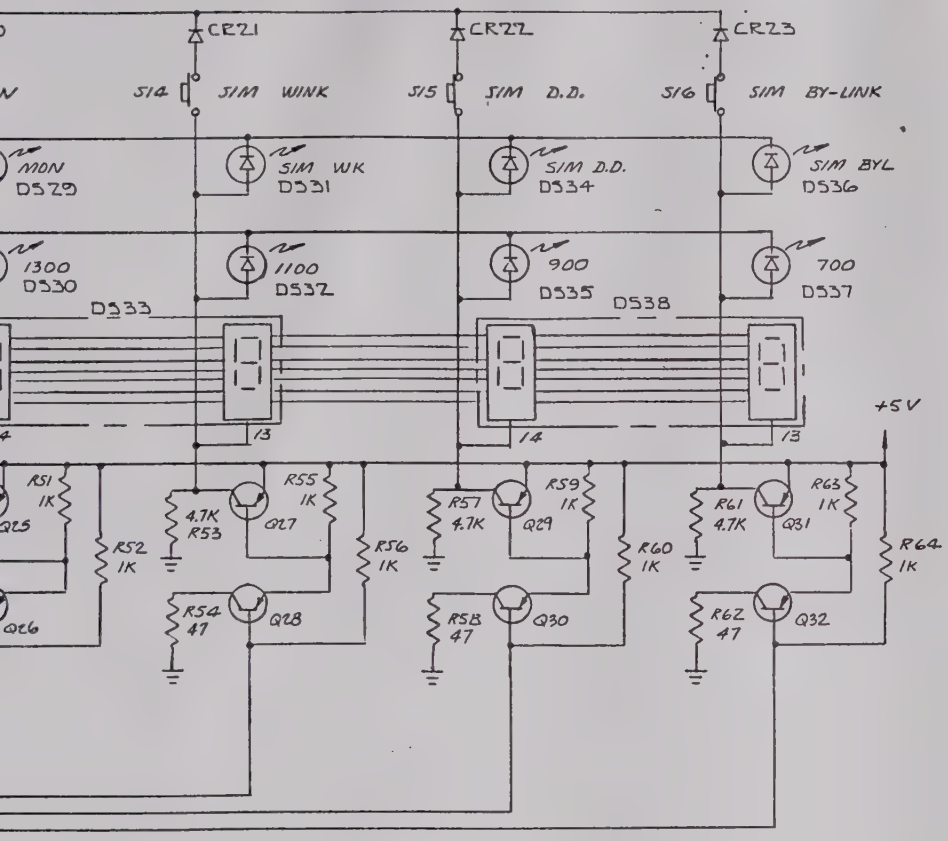
SCALE | WT. | SHEET 1 OF 2

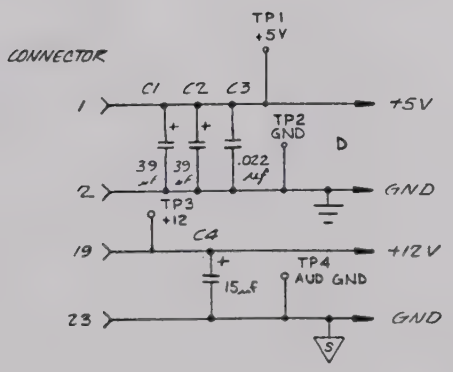
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION THAT MAY NOT BE DISCLOSED TO OTHERS, REPRODUCED OR USED WITHOUT WRITTEN AUTHORITY [redacted].





REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED





FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	SPECIFICATION

LIST OF MATERIAL OR PARTS LIST

NEXT ASSY	QTY	USED ON	QTY
APPLICATION			

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES

TOLERANCES ON: DECIMALS XX ± XXX ± ANGLES ± FRACTIONS ±

MATL

FINISH

CONTRACT NO.

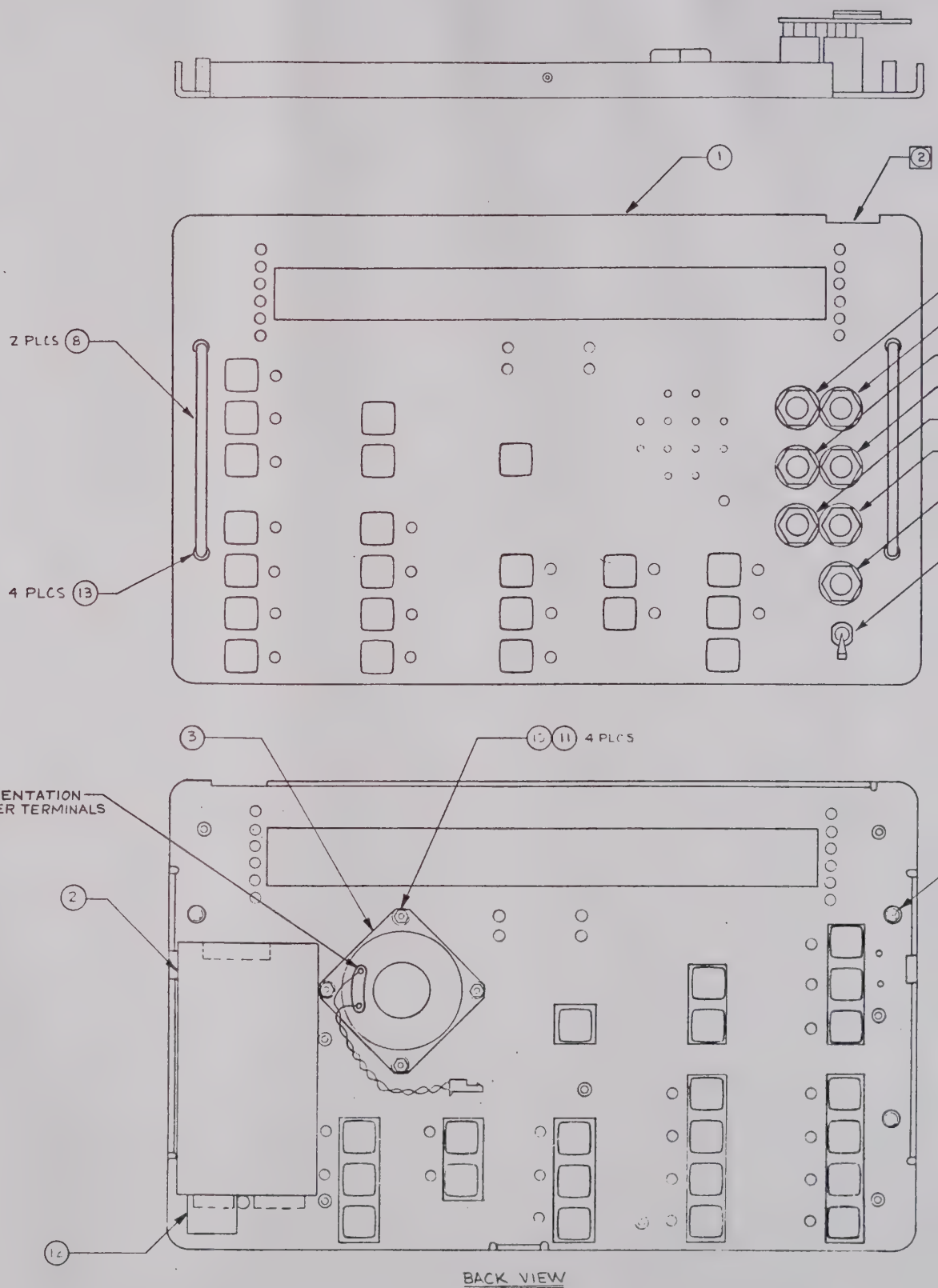
DRN	USCOTT	DATE 4-23-81
CHK		DATE
APP		DATE

BERRY ELECTRONICS, INC.

DRAWING TITLE
SCHEMATIC DRAWING
KEYBOARD / DISPLAY BD.

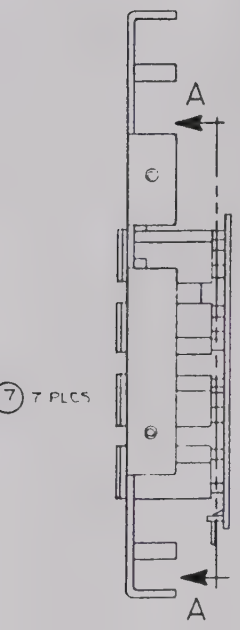
SIZE	CODE IDENT	DRAWING NO.	REV
D	[redacted]	1904-0004-01	B

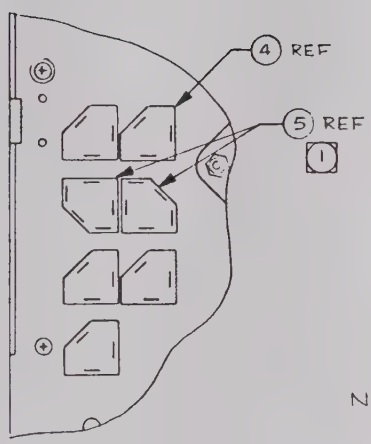
SCALE | WT. | SHEET 2 OF 2


1
2
2 PLCS 8
4 PLCS 13
3
10 11 4 PLCS
NOTE ORIENTATION OF SPEAKER TERMINALS
2
12

BACK VIEW

THIRD ANGLE PROJECTION	TABULATED DASH NUMBER(S)	NEXT B/M P/N(S)	QTY	E/C OR REVISION LEVEL	DESCRIPTION	ENGINEER E/C APPROVAL	DATE
DUAL DIMENSIONING FIELD USE — INCH / MM LOCAL AND GENERAL NOTE USE — INCH / MM				A	PRODUCTION RELEASE	[illegible]	7/21/86
				B	CHANGED PER ECO 201	[illegible]	1/23/87
				C	CHANGED PER ECO 02-90-14		6/4/90





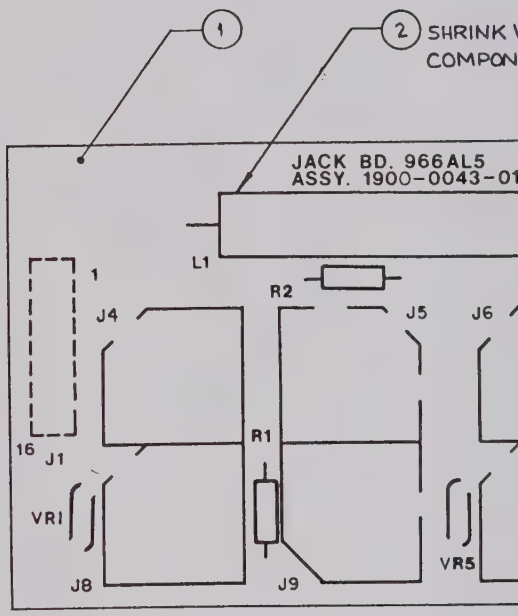
SECTION A-A

NOTES: UNLESS OTHERWISE SPECIFIED

1. INSTALL TELEPHONE JACKS, ITEMS 4 & 5, FROM REAR OF FRONT PANEL NOTING UNIQUE ORIENTATION OF TWO JACKS, ITEM 5, SHOWN IN SECTION A-A. TIGHTEN NUTS TO 6 IN. LBS MAX. TORQUE, PLACE JACK BOARD ASSY, ITEM 2, IN POSITION AND SOLDER.
2. NOTCH OUT OVERLAY TO DEPTH AND WIDTH OF METAL PANEL. CAUTION SHOULD BE USED NOT TO SCRATCH OVERLAY.

MATERIAL	TOLERANCES	SIGN OFF BY	INITIAL	DATE	
SEE P/L	.X ± .1 WITH C	DRAFTSPERSON	RS	7/19/84	BERRY ELECTRONICS
FINISH	.XX ± .01 .XXX ± .005 ANGLES ± 1°	DRAFTING CHECKER	EHZ.	7/21/86	
		ENGINEER APPROVAL	[illegible]	9/10/86	TITLE ASSEMBLY,
		PROJECT MANAGER			FRONT PANEL 966AL5
	SCALE NONE SHT 1 OF 1	DRAFTING MANAGER	[illegible]	7/21/86	D P/N 3000-0098-01
	DRAWING LEVEL C	ENGINEERING MANAGER	[illegible]	9/10/86	

0 1 2 3 4 5 6 INCH
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 MM



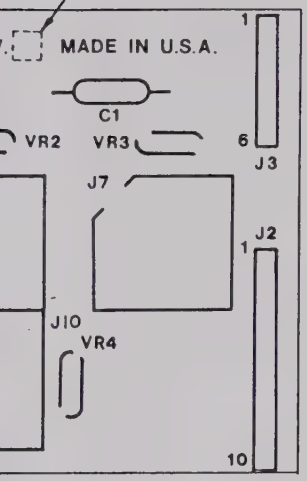
4. J4 THRU J10 ARE NOT TO BE INSTALLED AT THIS LEVEL.
3. TRIM COMPONENT LEADS TO .060 INCH FROM BOARD SURFACE.
(2) RUBBER STAMP LATEST REV. APPROX. WHERE SHOWN
1. FOR SCHEMATIC SEE 1904-0043-01.

NOTES: UNLESS OTHERWISE SPECIFIED

3000-0098-
NEXT ASSY

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	12/31/86	

P ENTIRE
(LI)



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

USED ON	QTY
966ALS	1
TION	

MATERIAL

FINISH

TOLERANCES (UNLESS OTHERWISE NOTED)

U S		METRIC	
xx '		x '	
xxx '		xx '	
ANGLES			

SCALE 2/1

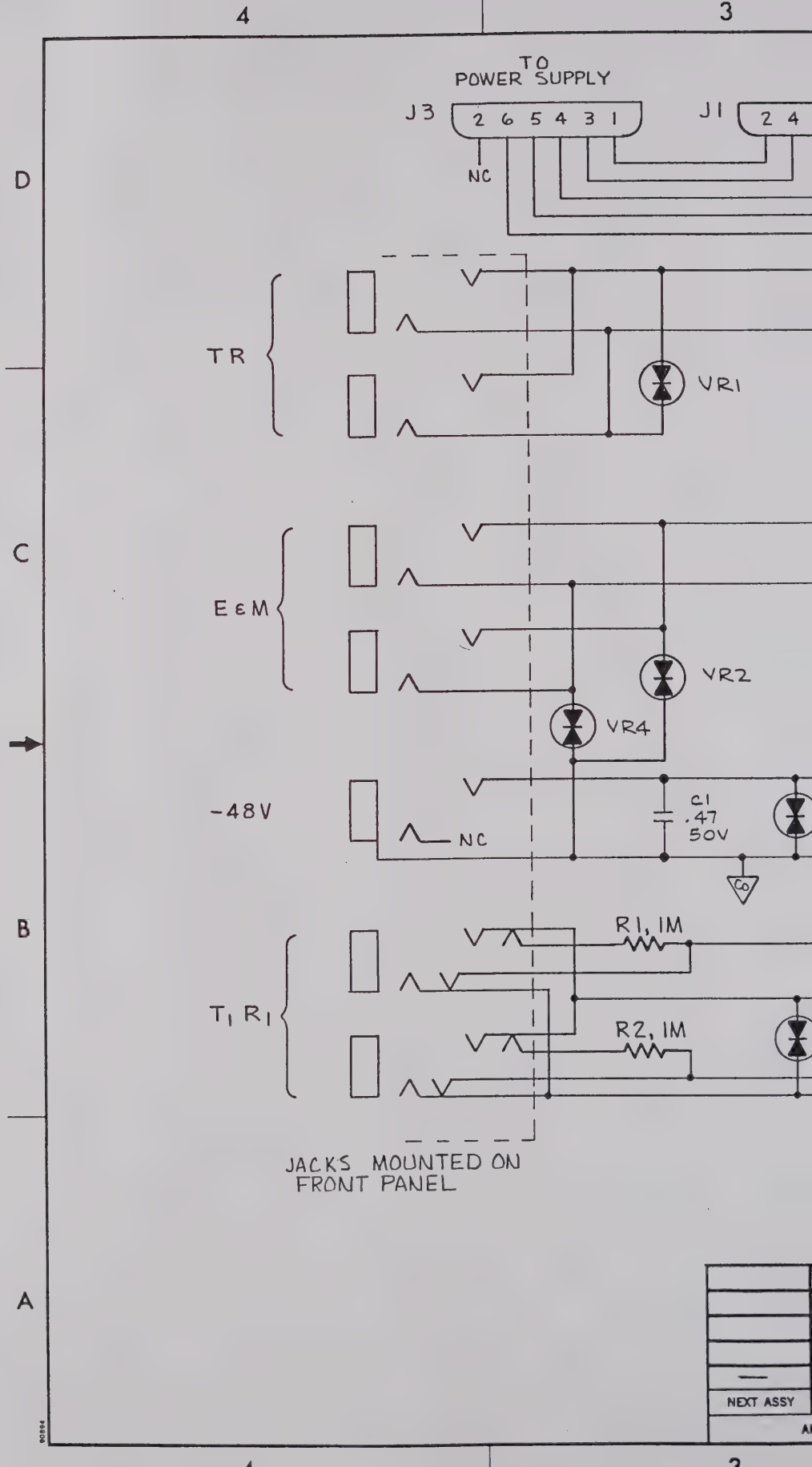
SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	VICKY	9/30/86
DRAFTING CHECKER	EHZ.	1/23/87
ENGINEER APPROVAL		1/27/87
PROJECT MANAGER		1/27/87
DRAFTING MANAGER	EHZ	1/23/87
ENGINEERING MANAGER		1/27/87

BERRY ELECTRONICS

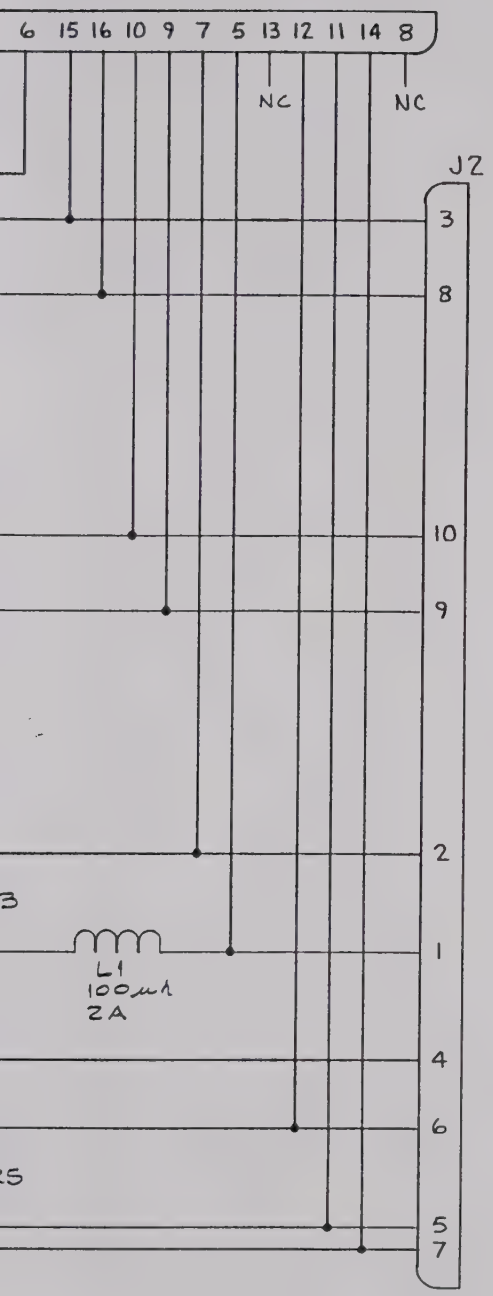
DRAWING TITLE
PCB ASSY.,
JACK 966ALS

C | DRAWING NO. 1900-0043-01 | REV A

SHEET 1 OF 1


4
3
TO
POWER SUPPLY
J3
2 6 5 4 3 1
NC
J1
2 4
D
TR
VR1
C
E ε M
VR2
VR4
-48V
NC
C1
.47
50V
Co
B
R1, IM
T1 R1
R2, IM
JACKS MOUNTED ON
FRONT PANEL
A
NEXT ASSY
4
3

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	12/31/86	



TO
DIGITAL
BOARD

FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

	QTY
66AL5	—
USED ON	
ON	

MATERIAL —//—

FINISH —//—

TOLERANCES (UNLESS OTHERWISE NOTED)

U.S.		METRIC	
.XX ±	—//—	x ±	
.XXX ±	—//—	xx ±	
ANGLES ±	—//—		

SCALE —//— (DO NOT SCALE DRAWING)

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	VICKY	9/25/86
DRAFTING CHECKER	EHZ.	1/23/87
ENGINEER APPROVAL		
PROJECT MANAGER		
DRAFTING MANAGER		1/23/87
ENGINEERING MANAGER		1/27/87

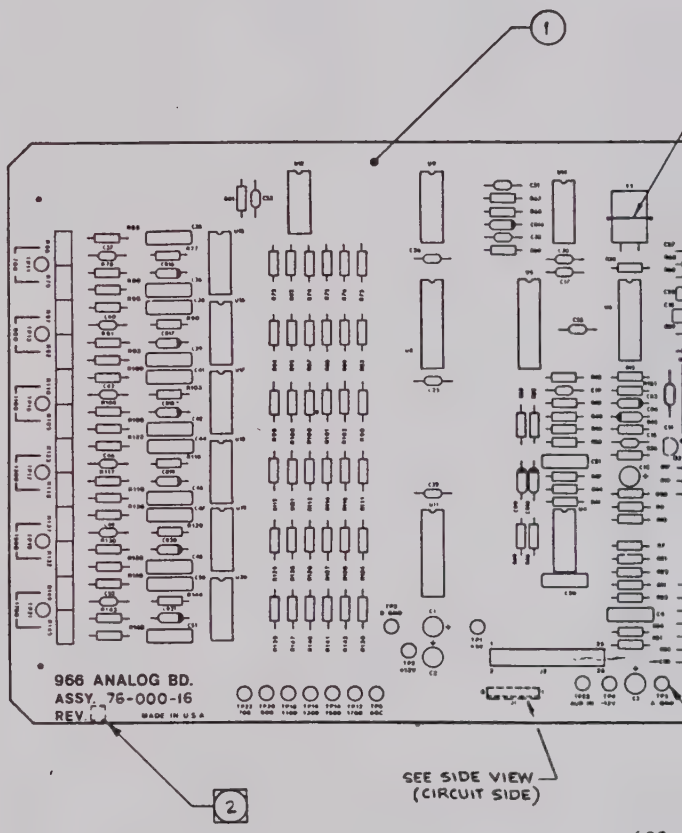
THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC

BERRY ELECTRONICS

DRAWING TITLE
SCHEMATIC DIAG.,
JACK BD. 966ALS

SIZE	DRAWING NO.	REV
C	1904-0043-01	A

SHEET 1 OF 1

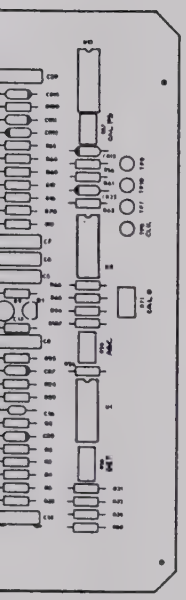


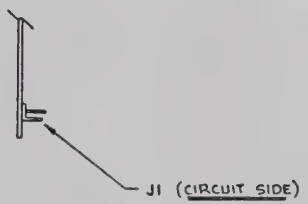
(23

3. TRIM COMPONENT LEADS TO .060 INCH FROM BOARD SURFACE TO END OF LEADS, EXCEPT IC LEADS.
2. RUBBER STAMP LATEST REV. APPROX. WHERE SHOWN.
1. FOR SCHEMATIC SEE DWG. SC76-000-16.

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	1/31/87	
	B	REVISED PER ECO 240	6/12/87	
	C	REVISED PER ECO 260		





FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.
			LIST OF MATERIAL OR PARTS LIST		

1000-0100-02	1	966A OPS 6	1		
1000-0100-01	1	966M OPS	1		
1002-0050-02	1	966M.OP4.6	1		
1002-0050-01	1	966M.OP4	1		
1002-0014-02	1	966A OP 0	1		
1002-0014-01	1	900 M	1		
NEXT ASSY	QTY	USED ON	QTY		
APPLICATION					

MATERIAL: SEE B.O.M

FINISH: —

TOLERANCES (UNLESS OTHERWISE NOTED): U.S. / METRIC

	U.S.		METRIC	
XX ±	—	XX ±	—	
XXX ±	—	XXX ±	—	
ANGLES	—			

SCALE 1/1 (DO NOT SCALE DRAWING)

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	VICKY	1/31/87
DRAFTING CHECKER	EHL	6/8/87
ENGINEER APPROVAL		
PROJECT MANAGER		
DRAFTING MANAGER		6/10/87
ENGINEERING MANAGER		6/12/87

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.

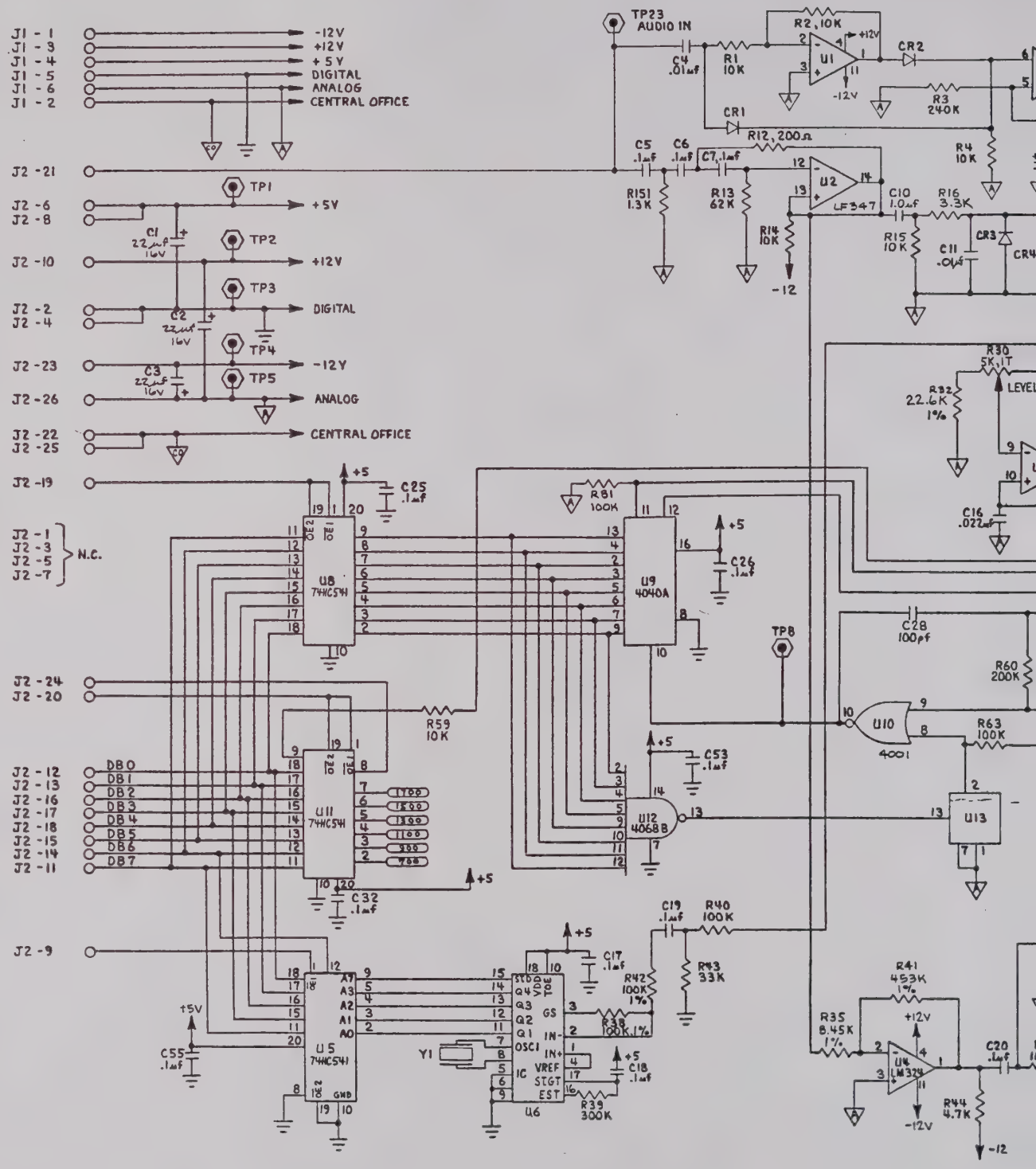
BERRY ELECTRONICS

DRAWING TITLE: PCB ASSY., 966 ANALOG

D | DRAWING NO. 1902-0041-02 | REV C

SHEET 1 OF 1

1902-0041-02 REV C

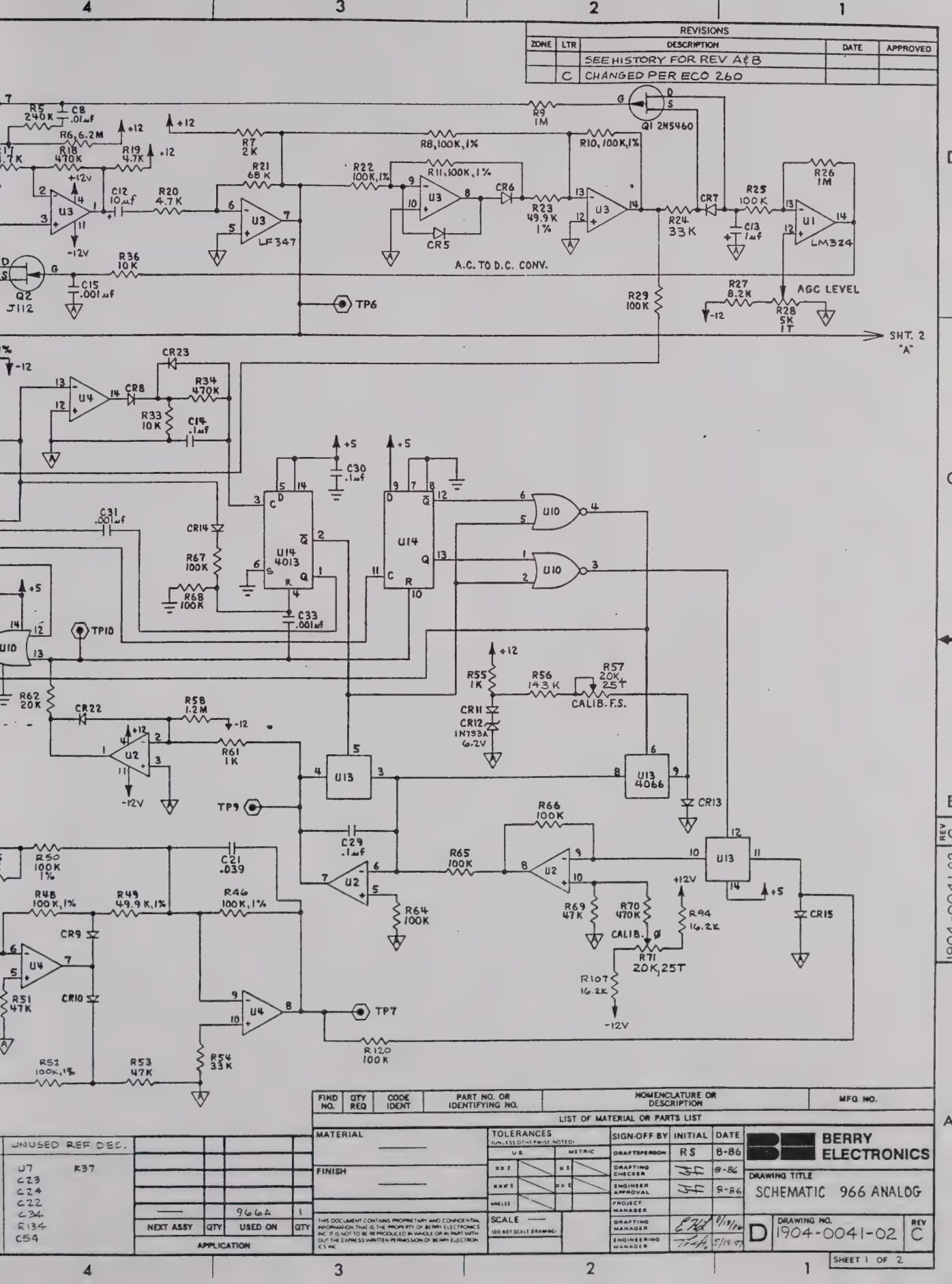


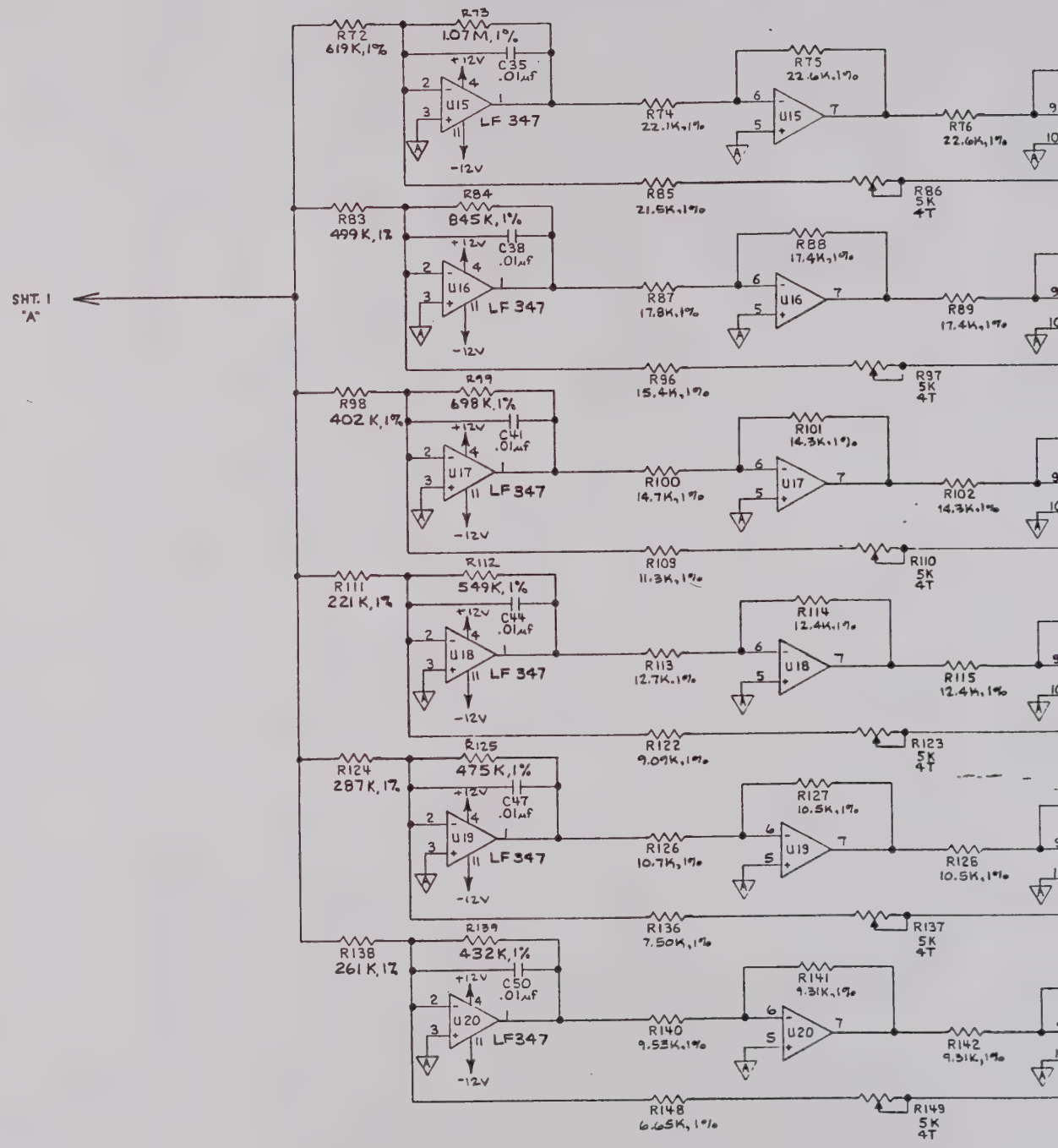
LAST REF. DES	
U20	J2
C55	Q2
2149	
CR23	
TP23	
Y1	

1. ALL UNSPECIFIED DIODES TO BE IN4148'S.

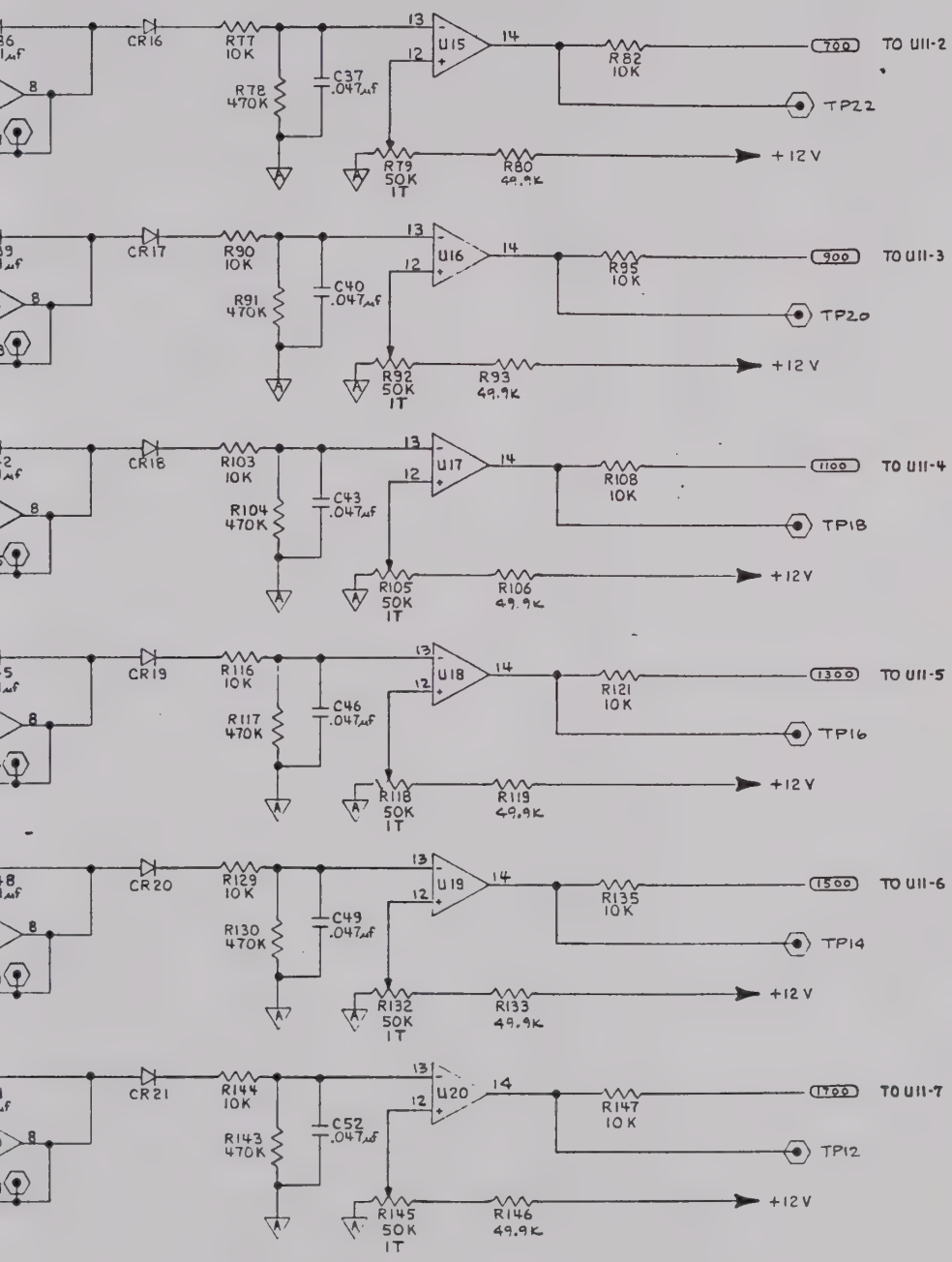
NOTES: UNLESS OTHERWISE SPECIFIED

8 7 6 5


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVED
C | CHANGED PER ECO 260
R5 240K
C8 .01uf
R6, 6.2M
R18 470K
R19 4.7K
+12
-12
U3
C12 10uf
R20 4.7K
R7 2K
R21 68K
LF347
R22 100K,1%
R11, 100K, 1%
R8, 100K, 1%
R10, 100K, 1%
CR6
CR5
R23 49.9K 1%
R9 1M
Q1 2N5460
R24 33K
CR7
R25 100K
C13 1uf
R26 1M
U1
LM324
A.C. TO D.C. CONV.
R36 10K
C15 .001uf
Q2 J112
TP6
R29 100K
R27 8.2K
R28 5K 1T
AGC LEVEL
SHT. 2 "A"
U4
CR8
CR23
R34 470K
R33 10K
C14 .1uf
C30 .1uf
C31 .001uf
CR14
R67 100K
R68 100K
U14 4013
C33 .001uf
U14
U10
TP10
R62 20K
CR22
R58 1.2M
R61 1K
U2
TP9
R55 1K
R56 143K
R57 20K 25T
CALIB. F.S.
CR11
CR12 IN753A 6.2V
U13
U13 4066
CR13
R66 100K
C29 .1uf
R65 100K
R64 100K
C21 .039
R50 100K 1%
R48 100K, 1%
R49 49.9K, 1%
R46 100K, 1%
CR9
CR10
R51 47K
R52 100K, 1%
R53 47K
R54 33K
TP7
R120 100K
R69 47K
R70 470K
CALIB. Ø
R71 20K, 25T
R94 16.2K
R107 16.2K
CR15
FIND NO. | QTY REQ | CODE IDENT | PART NO. OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | MFG NO.
LIST OF MATERIAL OR PARTS LIST
UNUSED REF. DES.
U7 R37
C23
C24
C22
C34
R134
C54
MATERIAL
FINISH
TOLERANCES (UNLESS OTHERWISE NOTED) U.S. METRIC
SCALE — DO NOT SCALE DRAWING
SIGN-OFF BY | INITIAL | DATE
DRAFTSPERSON RS 8-86
DRAFTING CHECKER 8-86
ENGINEER APPROVAL 8-86
PROJECT MANAGER
DRAFTING MANAGER 8/8/86
ENGINEERING MANAGER 5/19/87
BERRY ELECTRONICS
DRAWING TITLE
SCHEMATIC 966 ANALOG
DRAWING NO. 1904-0041-02
REV C
SIZE D
SHEET 1 OF 2
NEXT ASSY | QTY | USED ON | QTY
— | 966A | 1
APPLICATION
THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.


SHT. 1
"A"
R72
619K,1%
R73
1.07M,1%
C35
.01μf
+12V
U15
LF 347
-12V
R74
22.1K,1%
R75
22.6K,1%
R76
22.6K,1%
R85
21.5K,1%
R86
5K
4T
R83
499K,1%
R84
845K,1%
C38
.01μf
U16
LF 347
R87
17.8K,1%
R88
17.4K,1%
R89
17.4K,1%
R96
15.4K,1%
R97
5K
4T
R98
402K,1%
R99
698K,1%
C41
.01μf
U17
LF 347
R100
14.7K,1%
R101
14.3K,1%
R102
14.3K,1%
R109
11.3K,1%
R110
5K
4T
R111
221K,1%
R112
549K,1%
C44
.01μf
U18
LF 347
R113
12.7K,1%
R114
12.4K,1%
R115
12.4K,1%
R122
9.09K,1%
R123
5K
4T
R124
287K,1%
R125
475K,1%
C47
.01μf
U19
LF 347
R126
10.7K,1%
R127
10.5K,1%
R128
10.5K,1%
R136
7.50K,1%
R137
5K
4T
R138
261K,1%
R139
432K,1%
C50
.01μf
U20
LF347
R140
9.53K,1%
R141
9.31K,1%
R142
9.31K,1%
R148
6.65K,1%
R149
5K
4T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHT. 1		



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

NEXT ASSY	QTY	USED ON	QTY
—		966A	1

APPLICATION

MATERIAL —

FINISH —

TOLERANCES (UNLESS OTHERWISE NOTED)

	U.S.	METRIC
X ±		X ±
.XX ±		XX ±
ANGLES		

SCALE — (DO NOT SCALE DRAWING)

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITH OUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	RS	8-86
DRAFTING CHECKER		8-86
ENGINEER APPROVAL		8-86
PROJECT MANAGER		
DRAFTING MANAGER		9/10/86
ENGINEERING MANAGER		9/10/87

BERRY ELECTRONICS

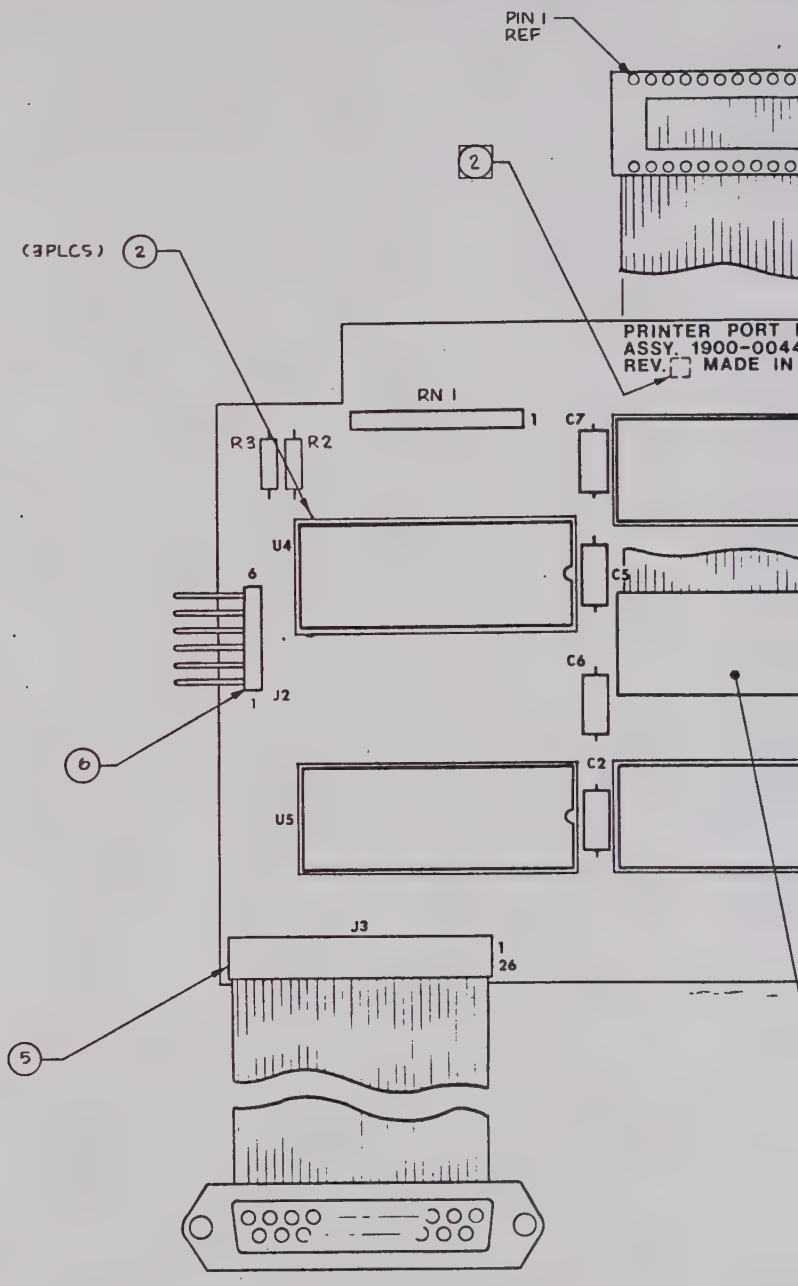
DRAWING TITLE
SCHEMATIC
966 ANALOG P.C.B.

DRAWING NO. 1904-0041-02 REV C

SIZE D

SHEET 2 OF 2

SC76-000-16 REV B



3. TRIM COMPONENT LEADS TO .060 INCH FROM BOARD SURFACE TO END OF LEAD, EXCEPT I.C. LEADS.

[2] RUBBER STAMP LATEST REV. APPROX. WHERE SHOWN.

1. FOR SCHEMATIC SEE DWG. 1904-0044-01.

NOTES: UNLESS OTHERWISE SPECIFIED

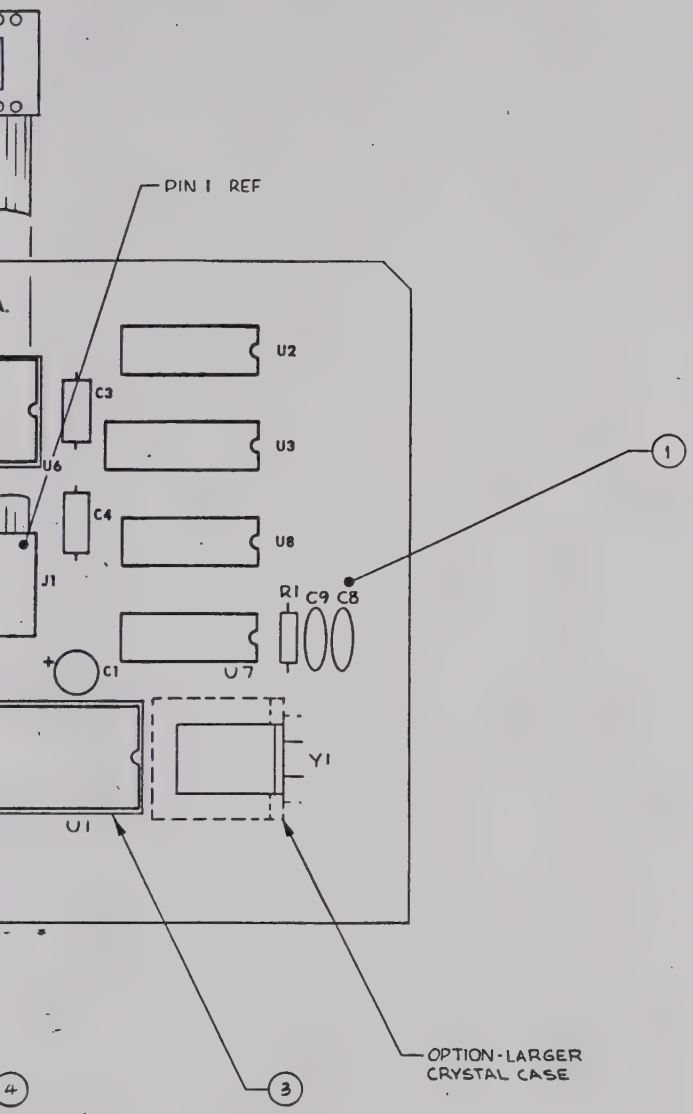
C

B

A

8 7 6 5

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	4-16-87	



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.
3002-0056-04	1	966A OP6	1		
3002-0056-03	1	966A OP6	1		
3000-0100-04	1	966A OP6	1		
3000-0100-03	1	966A OP6	1		
3002-0014-04	1	966A OP6	1		
3002-0014-03	1	966A OP6	1		

LIST OF MATERIAL OR PARTS LIST

NEXT ASSY	QTY	USED ON	QTY
APPLICATION			

MATERIAL: SEE PARTS LIST

FINISH: —

TOLERANCES (UNLESS OTHERWISE NOTED): U.S. / METRIC; .XX ±; .XXX ±; ANGLES ±

SCALE: NONE

SIGN OFF BY	INITIAL	DATE
DRAFTSPERSON	VICKY	1/21/87
DRAFTING CHECKER	EMZ.	4/16/87
ENGINEER APPROVAL		
PROJECT MANAGER		
DRAFTING MANAGER		4/16/87
ENGINEERING MANAGER		4/17/87

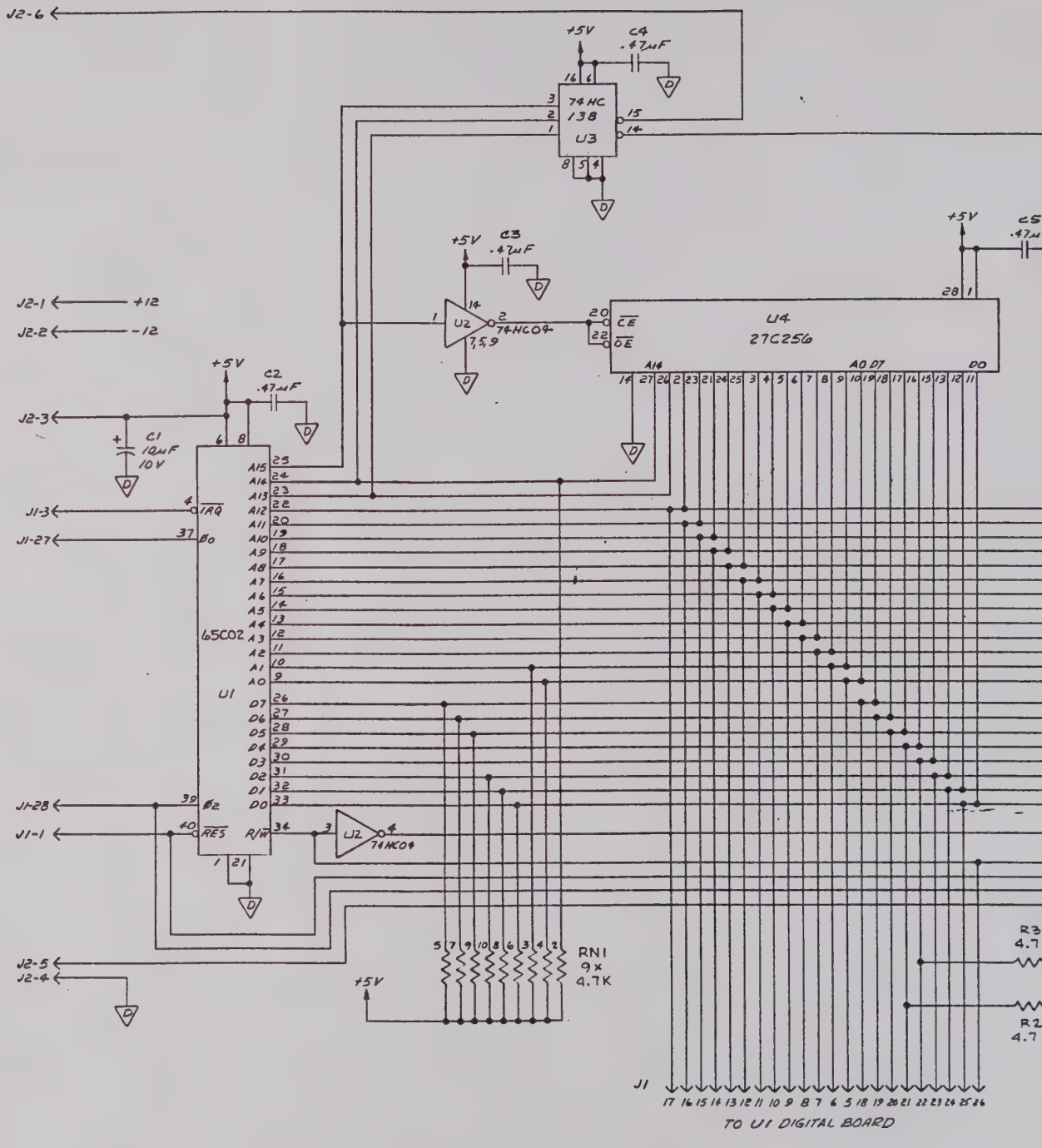
BERRY ELECTRONICS

DRAWING TITLE: PCB ASSY., PRINTER PORT

DRAWING NO. 1900-0044-01 | REV A

CSE # 76-000-17 | SHEET 1 OF 1

1900-0044-01 REV A


J2-6
+5V
C4
.47uF
74HC
138
U3
J2-1 +12
J2-2 -12
+5V
C3
.47uF
U2
74HC04
+5V
C5
.47u
U4
27C256
CE
OE
A16
A0 D7
D0
+5V
C2
.47uF
J2-3
C1
10uF
10V
J1-3
IRQ
J1-27
Bo
65C02
U1
J1-28
Ø2
J1-1
RES
R/W
U2
74HC04
RN1
9x
4.7K
+5V
J2-5
J2-4
R3
4.7
R2
4.7
J1
TO U1 DIGITAL BOARD

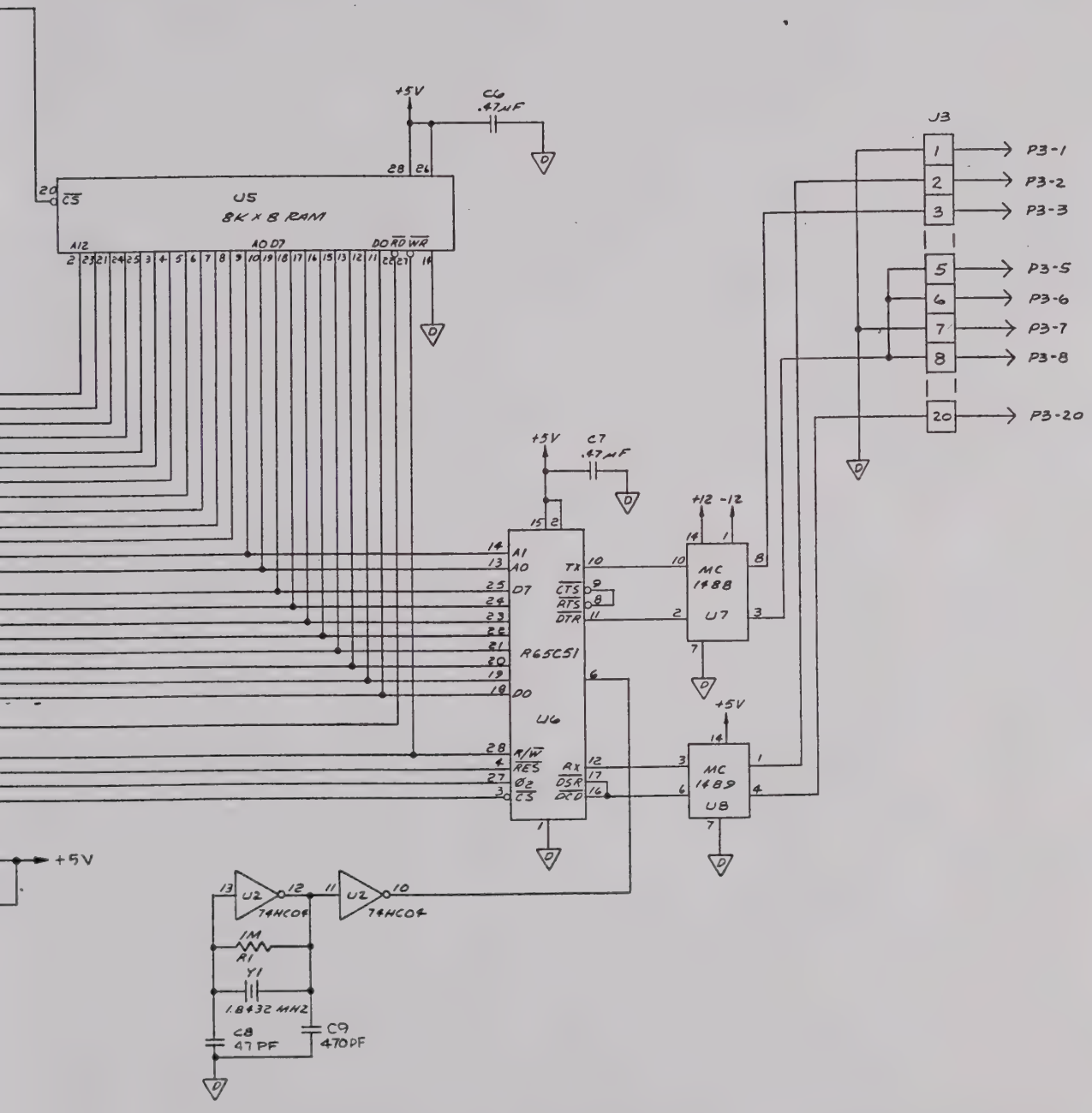
C

B

A

8 7 6 5

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	4-10-87	



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

NEXT ASSY	QTY	USED ON	QTY
—		SCC OPC	—

APPLICATION

MATERIAL

FINISH

TOLERANCES (UNLESS OTHERWISE NOTED): U.S. / METRIC
X ± / X ±
XX ± / XX ±
XXX ± / XXX ±
ANGLES

SCALE NONE (DO NOT SCALE DRAWING)

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON		4/1/87
DRAFTING CHECKER		
ENGINEER APPROVAL	MFT	1/12/87
PROJECT MANAGER		
DRAFTING MANAGER		4/16/87
ENGINEERING MANAGER		4/16/87

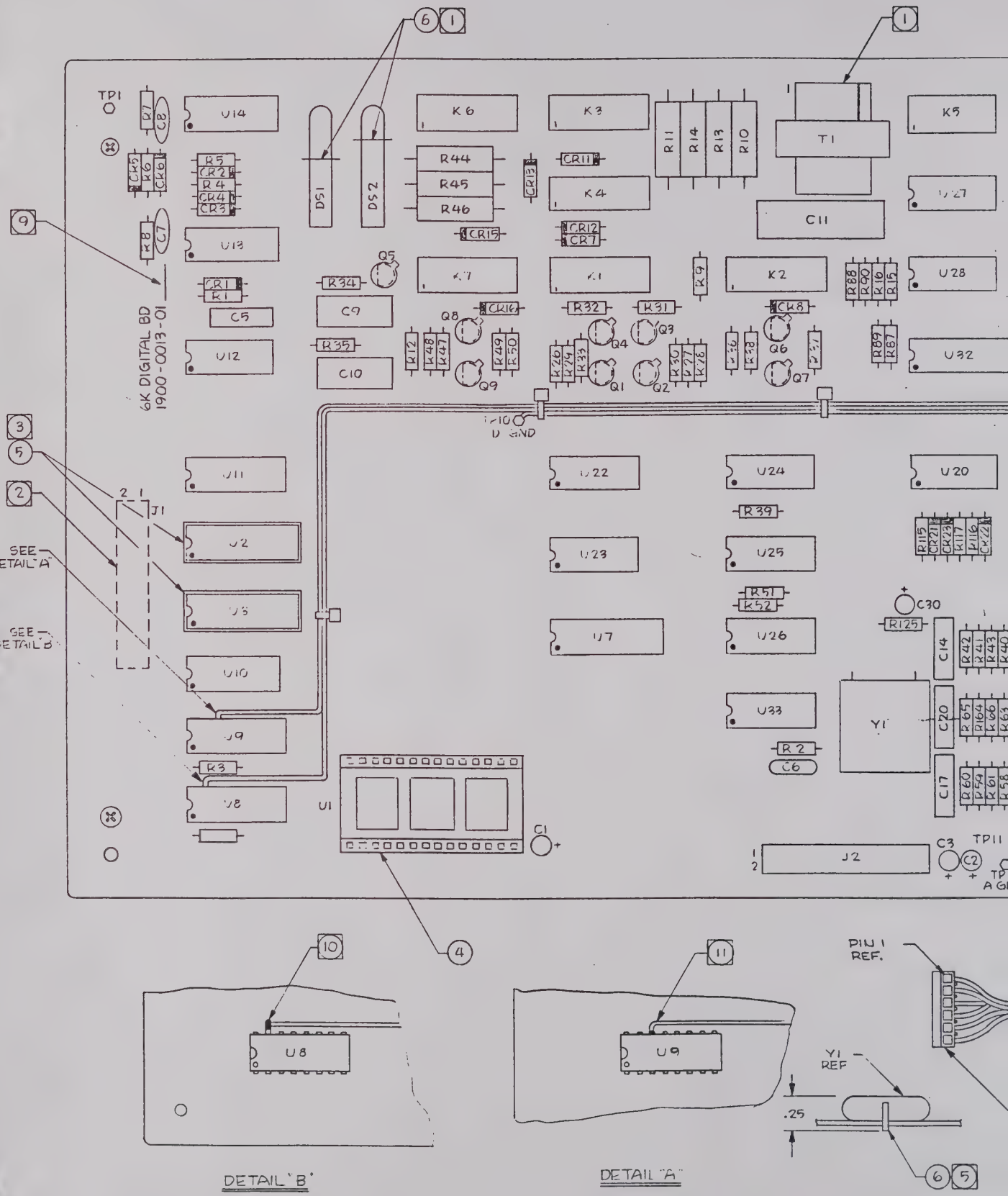
THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.

BERRY ELECTRONICS

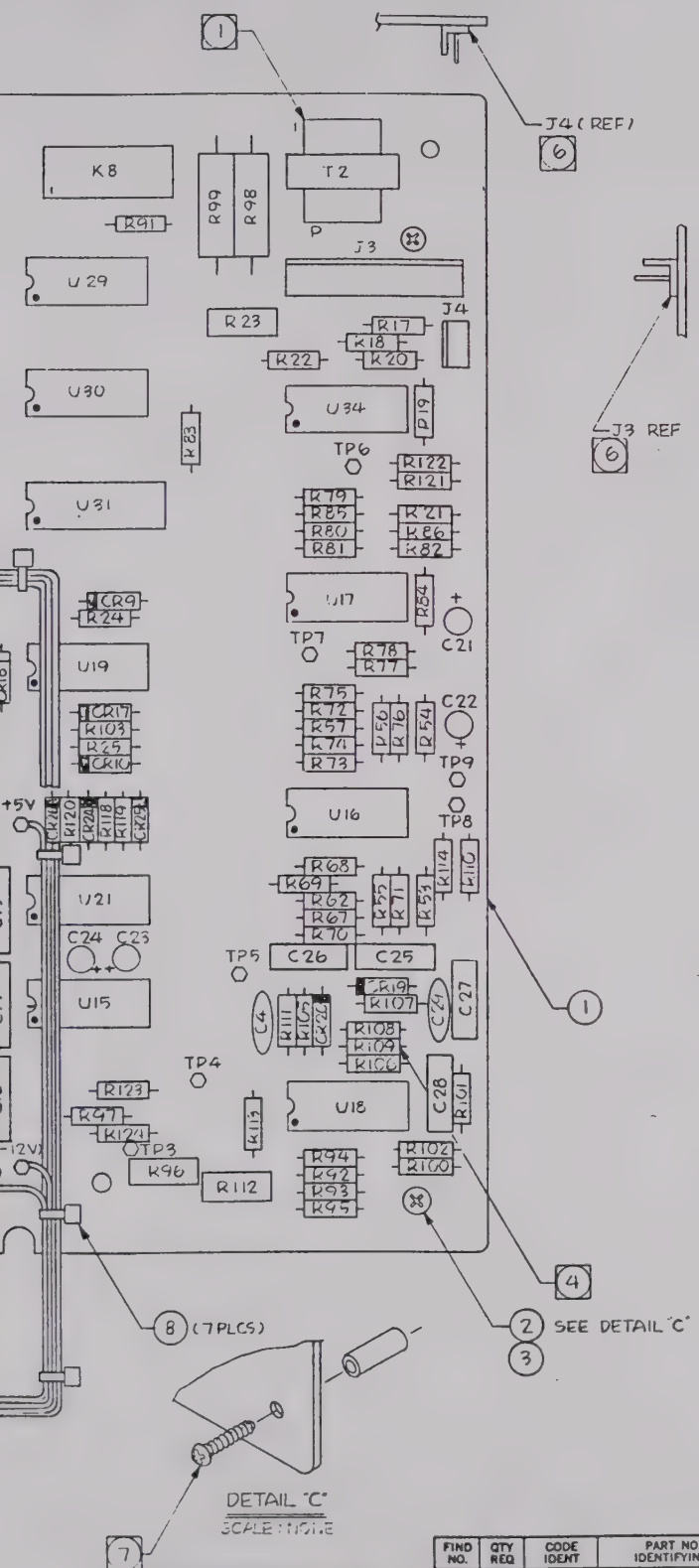
DRAWING TITLE: SCHEMATIC, PRINTER PORT

D | DRAWING NO. 1904-0044-01 | REV A

SHEET / OF /


6K DIGITAL BD
1900-0013-01
SEE DETAIL "A"
SEE DETAIL "B"
TP1
TP10
D GND
TP11
J1
J2
U1
U2
U3
U7
U8
U9
U10
U11
U12
U13
U14
U20
U22
U23
U24
U25
U26
U27
U28
U32
U33
K1
K2
K3
K4
K5
K6
K7
T1
C11
C30
Y1
DS1
DS2
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
DETAIL "B"
DETAIL "A"
PIN 1 REF.
Y1 REF
.25

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		



DETAIL "C"
SCALE : NONE

NOTE : UNLESS OTHERWISE SPECIFIED

1. DO NOT INSTALL THE FOLLOWING COMPONENTS UNTIL AFTER WAVE SOLDERING T1.T2.DS1.DS2.
2. INSTALL J1 ON FARSIDE OF BOARD AFTER WAVE SOLDERING.
3. DO NOT INSTALL THE FOLLOWING COMPONENTS IN SOCKETS UNTIL AFTER WAVE SOLDERING U2 AND U3.
4. DO NOT INSTALL R109. SOLDER MASK HOLES BEFORE WAVE SOLDERING.
5. SOLDER BUSS WIRE, ITEM (6) AS REQ'D TO CRYSTAL (Y1) THEN TO BOARD AS SHOWN.
6. ORIENTATE CONNECTORS J3 & J4 AS SHOWN.
7. USE LOCTITE NO 242 ON THREADS AS REQ'D.
8. TRIM COMPONENT LEADS TO .060 INCH FROM BOARD SURFACE TO END OF LEAD EXCEPTS I.C LEADS.
9. RUBBER STAMP LATEST REV WHERE SHOWN.
10. LIFT PIN 15 OF U8 UP AND ATTACH TO ITEM (7) (PIN 6 BLUE WIRE)
11. SOLDER ITEM 7 (PIN 5 GRN WIRE) TO PIN 14 OF U9

WIRING CHARTER			
ITEM NO	FROM	COLOR	TO
7	PIN 1	BRN	TP11 (+12V)
	2	RED	TP12 (-12V)
	3	ORG	TP (+5V)
	4	YEL	TP10 (DGND)
	5	GRN	U9 PIN14
7	PIN 6	BLU	U8 PIN15

FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.
			LIST OF MATERIAL OR PARTS LIST		
			3002-0056-04	1	966A	1
			3002-0056-03	1	966A	1
			3002-0054-04	1	965A	1
			3002-0053-04	1	965A	1
			3000-0100-04	1	966A	1
			3000-0100-03	1	966A	1

NEXT ASSY	QTY	USED ON	QTY
APPLICATION			

MATERIAL

FINISH

TOLERANCES (UNLESS OTHERWISE NOTED)

U.S.		METRIC	
XX ±	—	XX ±	—
.XXX ±	—	.XX ±	—
ANGLES ±	—		

SCALE 2:1
DO NOT SCALE DRAWING

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON		
DRAFTING CHECKER		
ENGINEER APPROVAL		
PROJECT MANAGER		
DRAFTING MANAGER		
ENGINEERING MANAGER		

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.

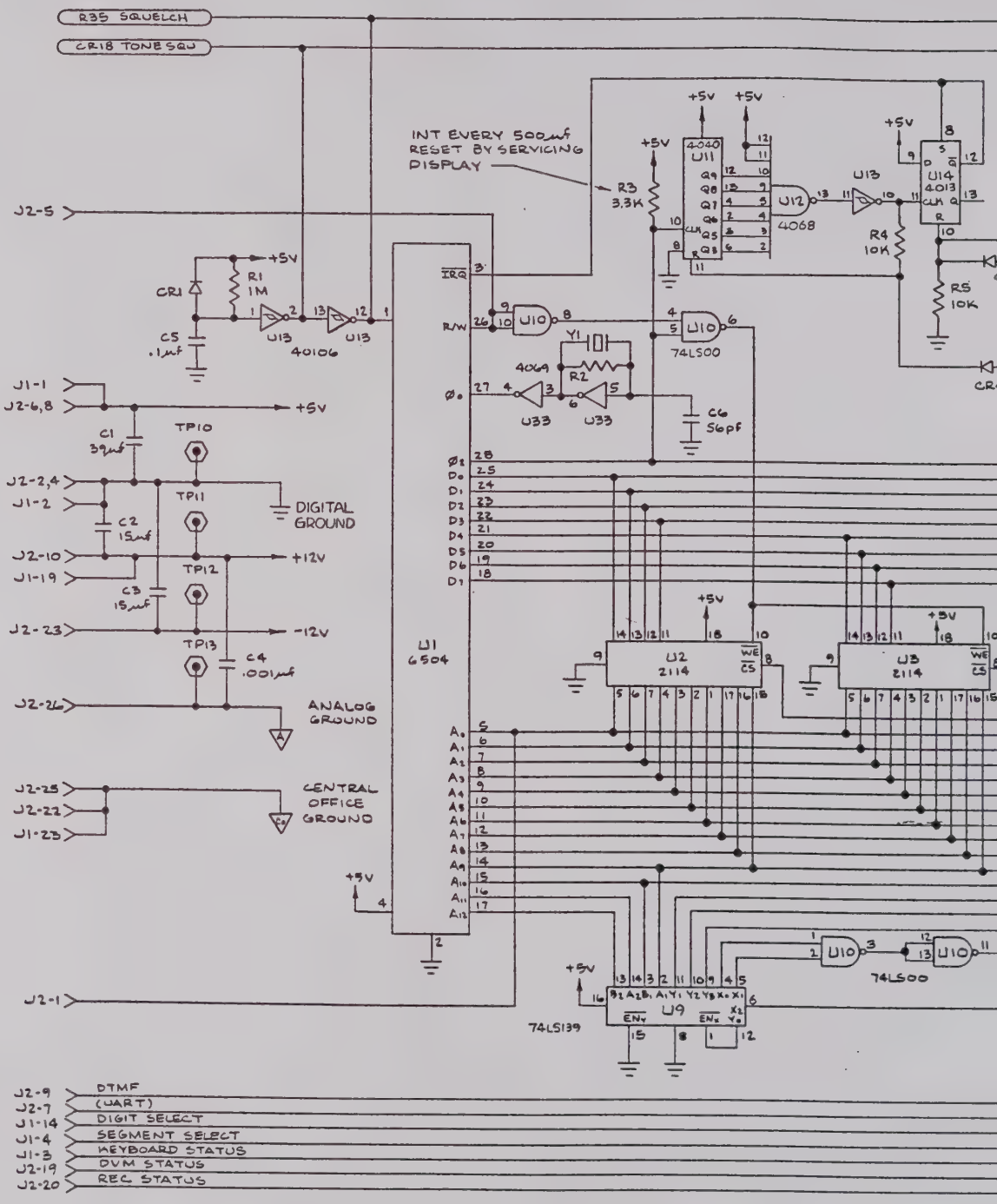
BERRY ELECTRONICS

DRAWING TITLE ASSY DIGITAL BD WITH CABLE HARNESS 966A OPTION 6

D | DRAWING NO. 1902-0013-02 | REV J

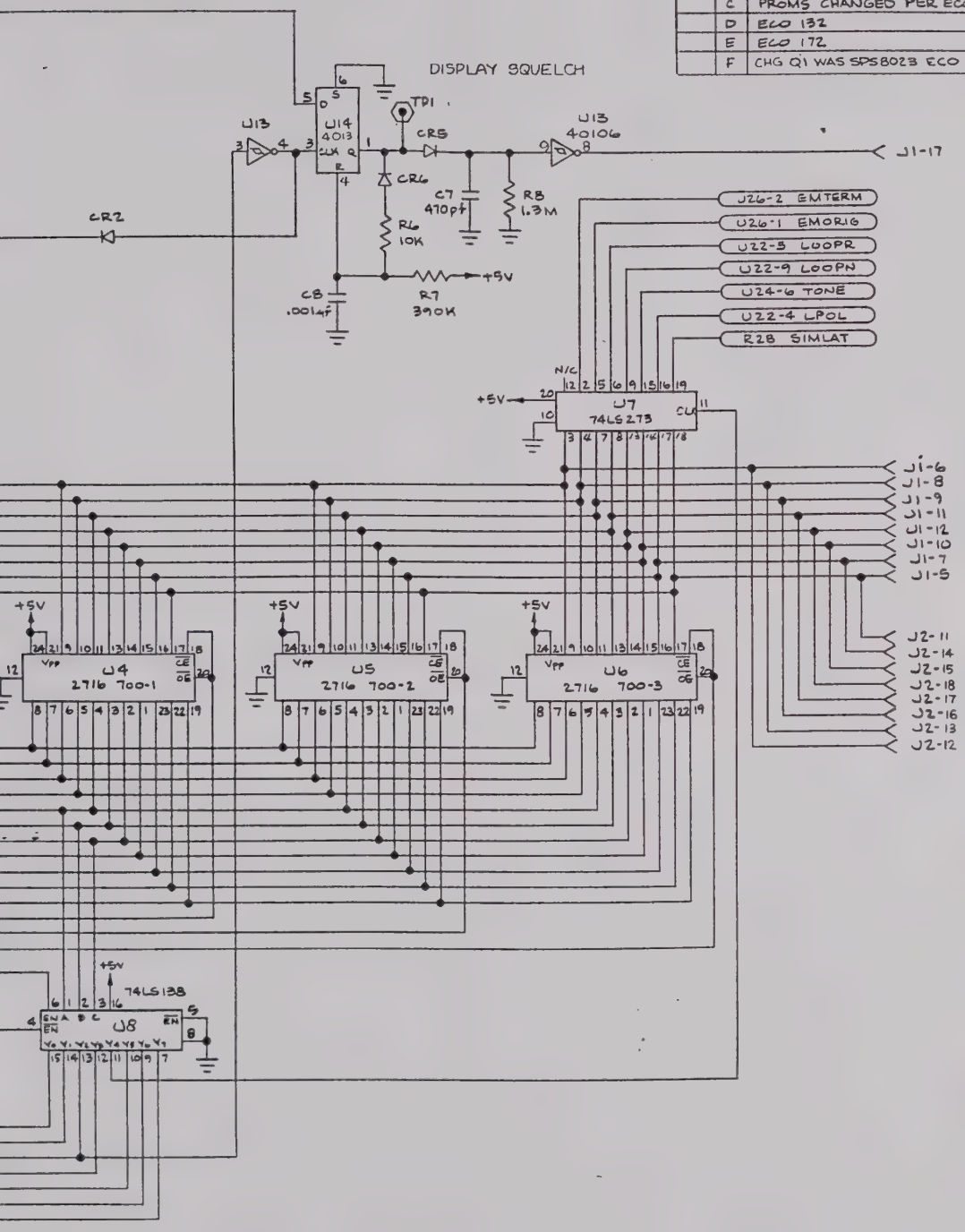
SHEET 1 OF 1

1902-0013-02 REV J


R35 SQUELCH
CR18 TONE SQU
INT EVERY 500mS
RESET BY SERVICING
DISPLAY
R3
3.3K
4040
U11
U12
4068
U13
U14
4013
R4
10K
R5
10K
J2-5
CR1
R1
1M
C5
.1mf
U13
40106
+5V
J1-1
J2-6,8
C1
39mf
TP10
J2-2,4
J1-2
TP11
C2
15mf
DIGITAL
GROUND
J2-10
J1-19
+12V
TP12
C3
15mf
J2-23
-12V
TP13
C4
.001mf
J2-26
ANALOG
GROUND
J2-25
J2-22
J1-23
CENTRAL
OFFICE
GROUND
U1
6504
IRQ
R/W
Ø0
Ø2
D0
D1
D2
D3
D4
D5
D6
D7
U10
74LS00
Y1
4069
R2
U33
C6
56pf
U2
2114
U3
2114
WE
CS
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
J2-1
U9
74LS139
J2-9
J2-7
J1-14
J1-4
J1-3
J2-19
J2-20
DTMF
(UART)
DIGIT SELECT
SEGMENT SELECT
KEYBOARD STATUS
DVM STATUS
REC STATUS

8 7 6 5

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	2/84	
	B	ECO 101	4/9/85	
	C	PROMS CHANGED PER ECO 129	5/15/85	
	D	ECO 132	5/24/85	
	E	ECO 172	1/29/86	
	F	CHG Q1 WAS SPS8023 ECO 02-92-66	6-29-92	



FIND NO.	QTY REQ	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MFG NO.

LIST OF MATERIAL OR PARTS LIST

NEXT ASSY	QTY	USED ON	QTY
		966AL3	1
		966AL4	1

APPLICATION

MATERIAL

FINISH

TOLERANCES (UNLESS OTHERWISE NOTED): U.S. / METRIC

SCALE (DO NOT SCALE DRAWING)

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC.

SIGN-OFF BY	INITIAL	DATE
DRAFTSPERSON	VICKY	3-23-87
DRAFTING CHECKER	K.S.	
ENGINEER APPROVAL		
PROJECT MANAGER		
DRAFTING MANAGER	EJH	8/05/87
ENGINEERING MANAGER		

BERRY ELECTRONICS

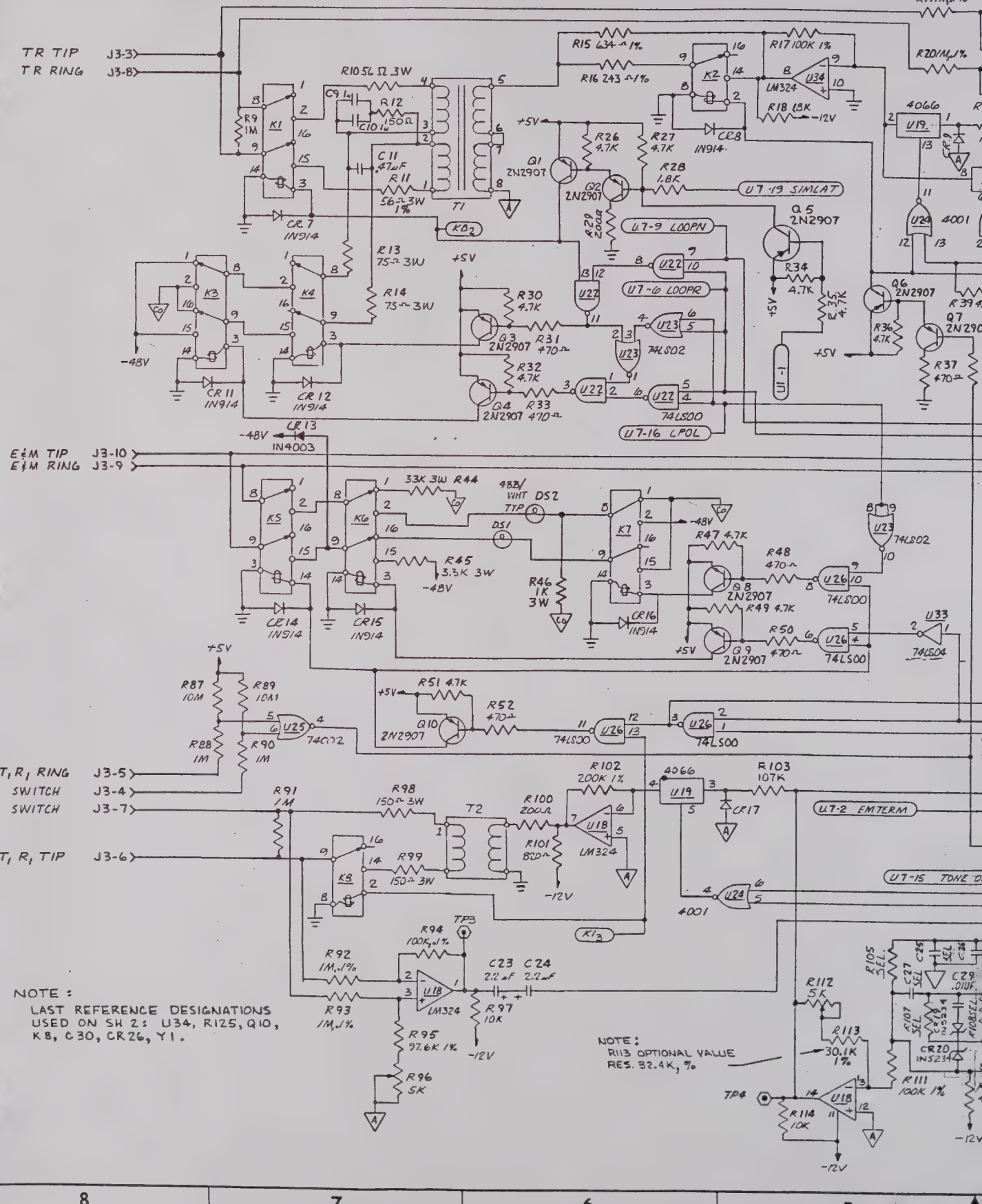
DRAWING TITLE: SCHEMATIC, 6K DIGITAL BD.

D | DRAWING NO. 1904-0013-01 | REV F

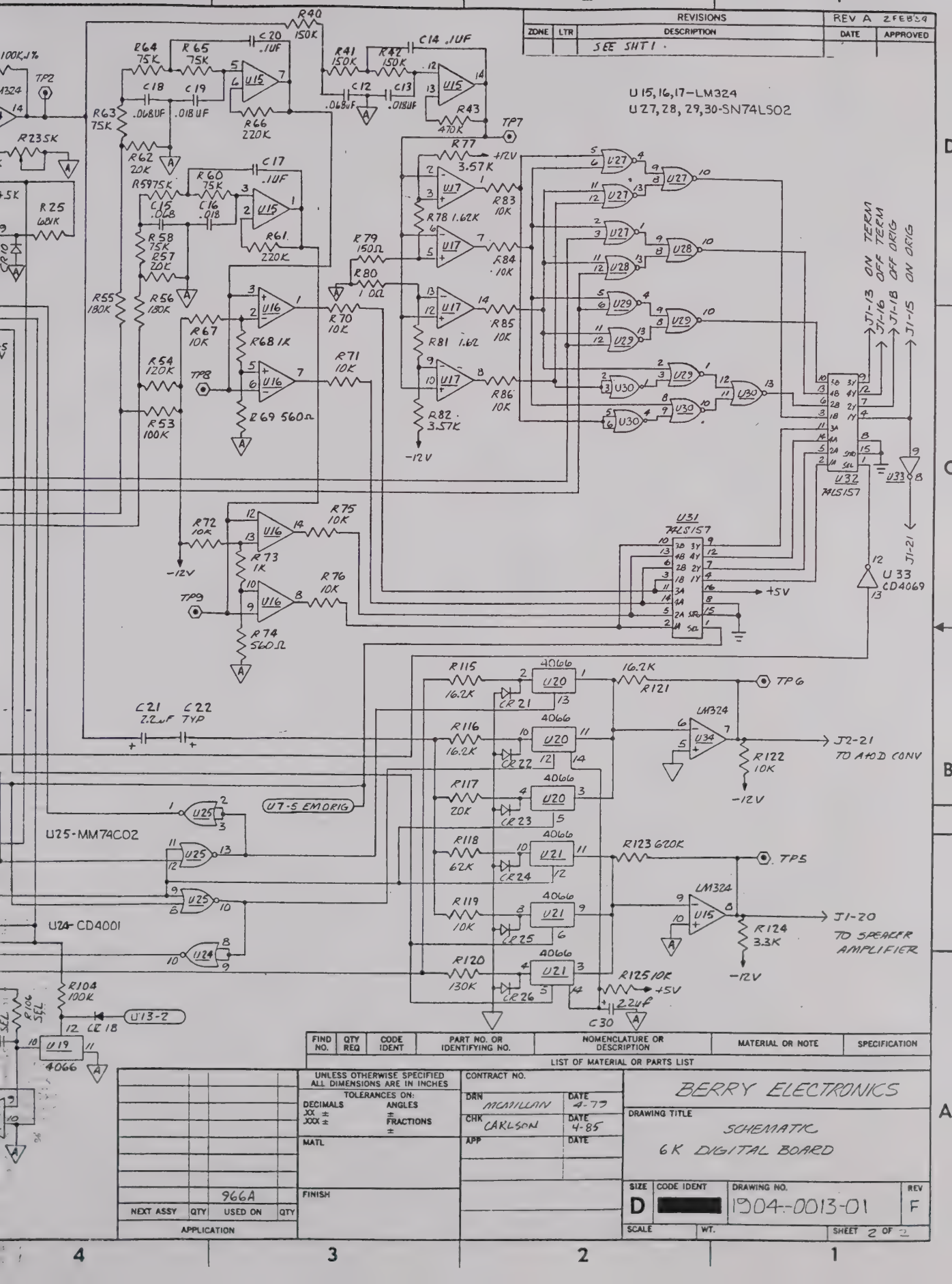
SHEET 1 OF 2

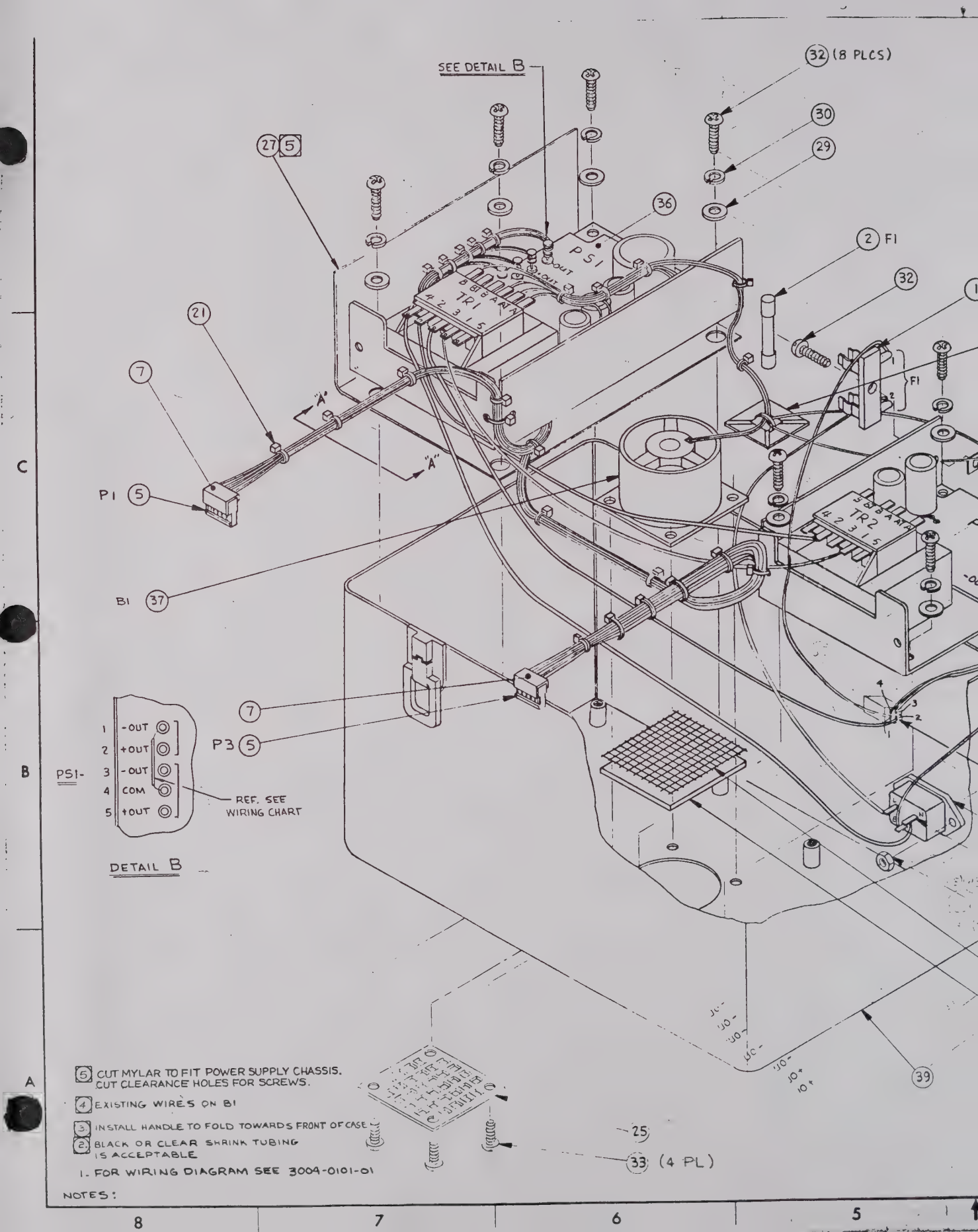
1904-0013-01 REV F

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION THAT MAY NOT BE DISCLOSED TO OTHERS, REPRODUCED OR USED WITHOUT WRITTEN AUTHORITY FROM [redacted]

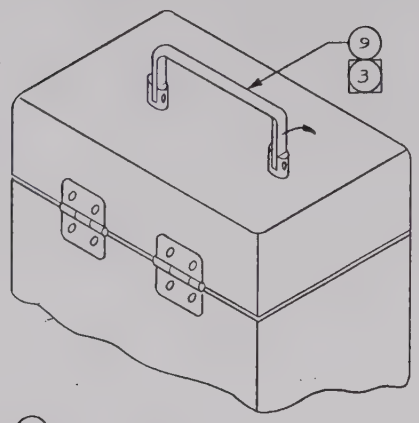


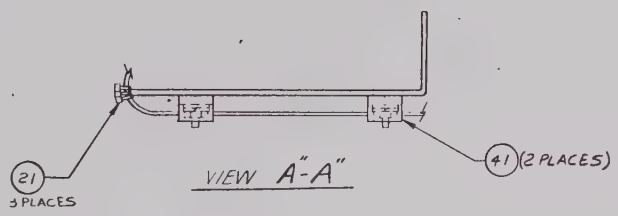
8 7 6 5

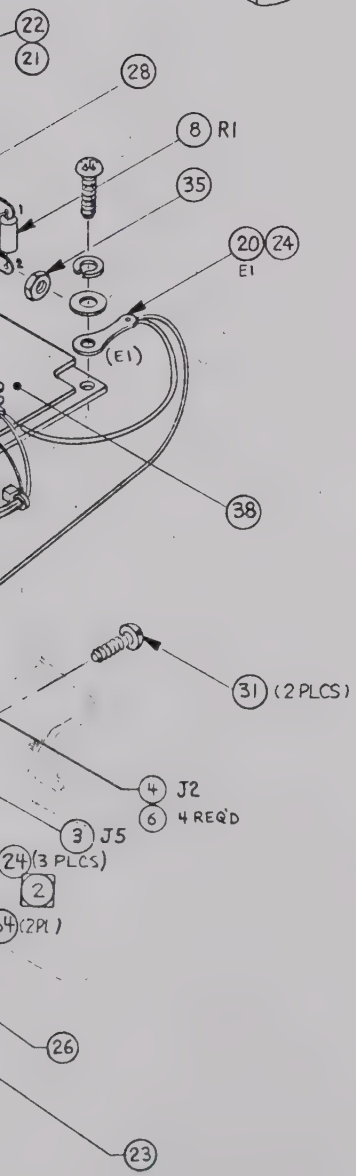

REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVED
SEE SHT 1
REV A 2FEB84
U15,16,17-LM324
U27,28,29,30-SN74LS02
U25-MM74C02
U24-CD4001
U33 CD4069
U32 74LS157
U31 74LS157
J1-13 ON TERM
J1-16 OFF TERM
J1-18 OFF ORIG
J1-15 ON ORIG
J1-21
J2-21 TO A-D CONV
J1-20 TO SPEAKER AMPLIFIER
U7-5 EMORIG
U13-2
+12V
-12V
+5V
TP2
TP6
TP7
TP8
TP9
TP5
C21 C22 2.2uF TYP
C30 .22uF
R40 150K
R41 150K
R42 150K
R43 470K
R63 75K
R64 75K
R65 75K
R66 220K
R23 5K
R25 60K
R53 100K
R54 120K
R55 180K
R56 180K
R58 75K
R59 75K
R60 75K
R61 220K
R62 20K
R67 10K
R68 1K
R69 560Ω
R70 10K
R71 10K
R72 10K
R73 1K
R74 560Ω
R75 10K
R76 10K
R77 3.57K
R78 1.62K
R79 150Ω
R80 1.0Ω
R81 1.62K
R82 3.57K
R83 10K
R84 10K
R85 10K
R86 10K
R104 100K
R115 16.2K
R116 16.2K
R117 20K
R118 62K
R119 10K
R120 130K
R121 16.2K
R122 10K
R123 620K
R124 3.3K
R125 10K
C12 .068uF
C13 .018uF
C14 .1UF
C15 .068
C16 .018
C17 .1UF
C18 .068UF
C19 .018 UF
C20 .1UF
CR18
CR21
CR22
CR23
CR24
CR25
CR26
U15
U16
U17
U19 4066
U20 4066
U21 4066
U34 LM324
966A
NEXT ASSY | QTY | USED ON | QTY
APPLICATION
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES
TOLERANCES ON: DECIMALS XX ± XXX ± ANGLES ± FRACTIONS ±
MATL
FINISH
CONTRACT NO.
DRN MCMILLAN DATE 4-77
CHK CARLSON DATE 4-85
APP DATE
FIND NO. | QTY REQ | CODE IDENT | PART NO. OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | MATERIAL OR NOTE | SPECIFICATION
LIST OF MATERIAL OR PARTS LIST
BERRY ELECTRONICS
DRAWING TITLE
SCHEMATIC
6K DIGITAL BOARD
SIZE D
CODE IDENT
DRAWING NO. 1004-0013-01
REV F
SCALE
WT.
SHEET 2 OF 2
4
3
2
1


SEE DETAIL B
32 (8 PLCS)
30
29
27 5
36
2 F1
32
21
7
"A"
"A"
P1 5
B1 37
7
P3 5
PS1-
1 -OUT
2 +OUT
3 -OUT
4 COM
5 +OUT
REF. SEE WIRING CHART
DETAIL B
PS1
TR1
TR2
F1
39
25
33 (4 PL)
5 CUT MYLAR TO FIT POWER SUPPLY CHASSIS. CUT CLEARANCE HOLES FOR SCREWS.
4 EXISTING WIRES ON B1
3 INSTALL HANDLE TO FOLD TOWARDS FRONT OF CASE
2 BLACK OR CLEAR SHRINK TUBING IS ACCEPTABLE
1. FOR WIRING DIAGRAM SEE 3009-0101-01
NOTES:

THIRD ANGLE PROJECTION	TABULATED DASH NUMBER(S)	NEXT B.M.P.N(S)	QTY	E/C OR REVISION LEVEL	DESCRIPTION	ENGINEER E/C APPROVAL	DATE
DUAL DIMENSIONING				A	PRODUCTION RELEASE		7/21/96
FIELD USE INCH / MM				B	REV'D PER ECO 206		8/3/96
LOCAL AND GENERAL NOTE USE INCH / MM				C	REV'D PER ECO 02-90-15		6/5/90
				D	REV'D. WIRE CHART		9/13/92







WIRE LIST

ITEM NO.	FROM	COLOR	TO	SIZE	INCHES
15	J5 -E	GRN	E1	22 AWG	3
15	J5 -E	GRN	PS1-1 (-)		21
17	J5 -N	WHT	TR1-4		15.5
17	TR1 -2	WHT	TR2-2		8
10	J5 -L	BLK	F1-2		6
12	F1 -1	RED	J2-1		15
10	J2 -2	BLK	TR1-3		8
10	TR1 -1	BLK	TR2-1		8
4 10	TR1 -A(1)	BLK	B1-2		—
4 14	B1 -1	YEL	R1-2		—
14	R1 -1	YEL	TR1-A(2)		12
19	PS2 (-OUT)	BLK (TWISTED PAIR)	J2-4		15
	PS2 (+OUT)	RED (TWISTED PAIR)	J2-3		
15	PS1-1 (-OUT)	GRN	PS1-4 (COM)		2
12	PS1-1 (-OUT)	RED	P1-2		26
12	PS1-1 (-OUT)	RED	P3-2		26
15	PS1-1 (-OUT)	GRN	P1-5		26
15	PS1-1 (-OUT)	GRN	P3-5		26
14	PS1-2 (+OUT)	YEL	P1-4		26
14	PS1-2 (+OUT)	YEL	P3-4		26
11	PS1-3 (-OUT)	BRN	P1-1		26
11	PS1-3 (-OUT)	BRN	P3-1		26
16	PS1-4 (COM)	BLU	P1-6		26
16	PS1-4 (COM)	BLU	P3-6		26
13	PS1-5 (+OUT)	ORN	P1-3		26
13	PS1-5 (+OUT)	ORN	P3-3		26
15	PS2 (+OUT)	GRN	E1	22 AWG	3

MATERIAL	TOLERANCES	SIGN OFF BY	INITIAL	DATE	
SEE B/M 3002-0102-01	US / METRIC	DRAFTSPERSON	SCOTT	3/26/96	BERRY ELECTRONICS
FINISH	XX ± / .XX ± — XX ±	DRAFTING CHECKER	EHZ.	7/21/96	TITLE ASSY, CASE
—	XXX ± / .XXX ± — XXX ±	ENGINEER APPROVAL		7/24/96	PART BASIC 966AL5
	ANGLES ±	PROJECT MANAGER			PART DESCRIPTION
THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION THAT IS THE PROPERTY OF BERRY ELECTRONICS INC. IT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF BERRY ELECTRONICS INC	SCALE 1:3/4 DO NOT SCALE DRAWING	DRAFTING MANAGER		7/24/96	D P/N 3000-0102-01
	SHT 1 OF 1	ENGINEERING MANAGER		9/10/96	
	DRAWING LEVEL C				

Document Title: Product Manuals	Document Number: ESC-2601-93-01
Revision Number: A X B_ C_ D_ E_	Page: N/A
Prepared By: Rick Schultz	Approved By: [signature]
Issued By: Jim Steinau	Issue Date: 10/19/93

CHANGE NOTICE SUMMARY

Revision	Reason for Change	Date of Change